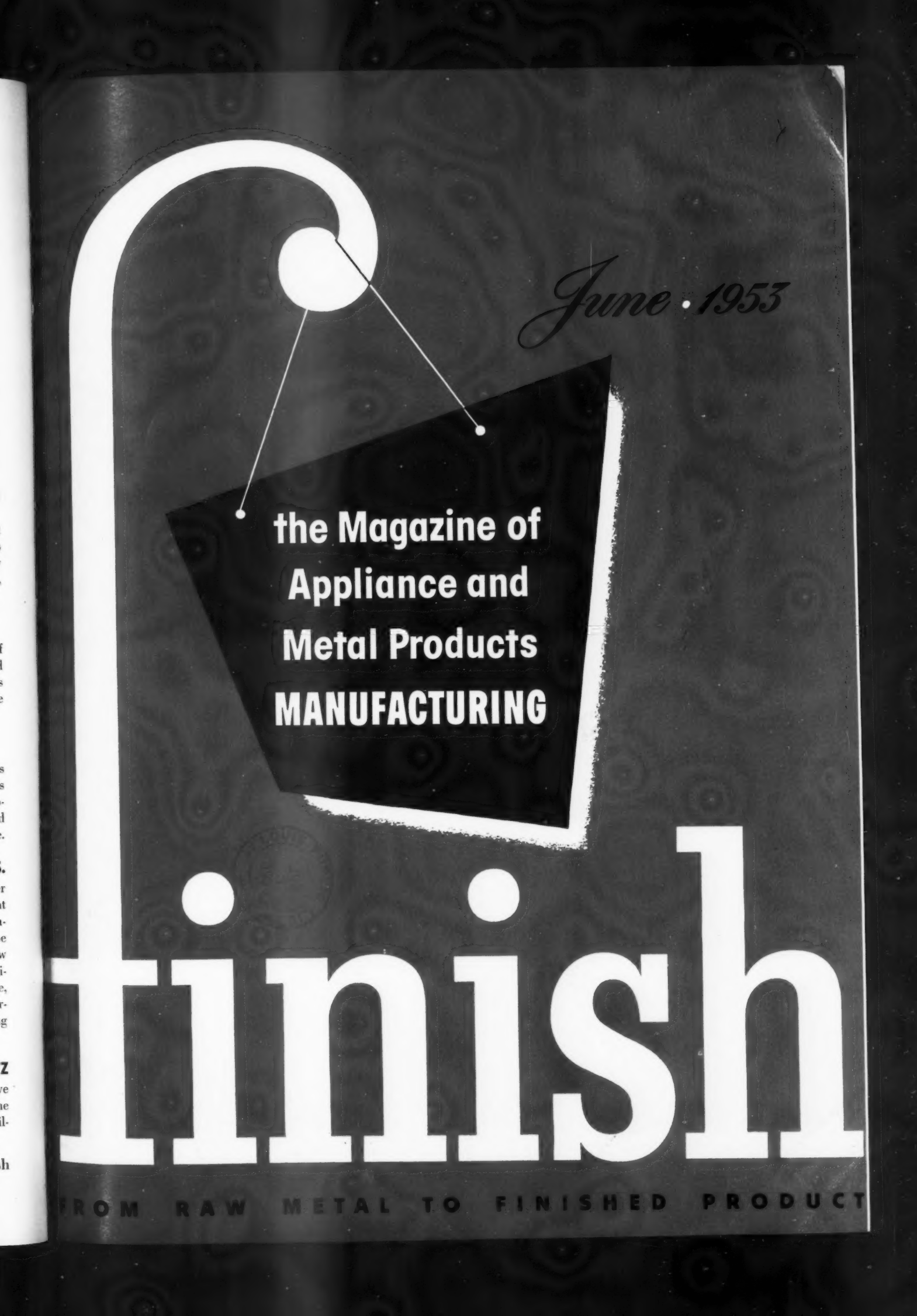
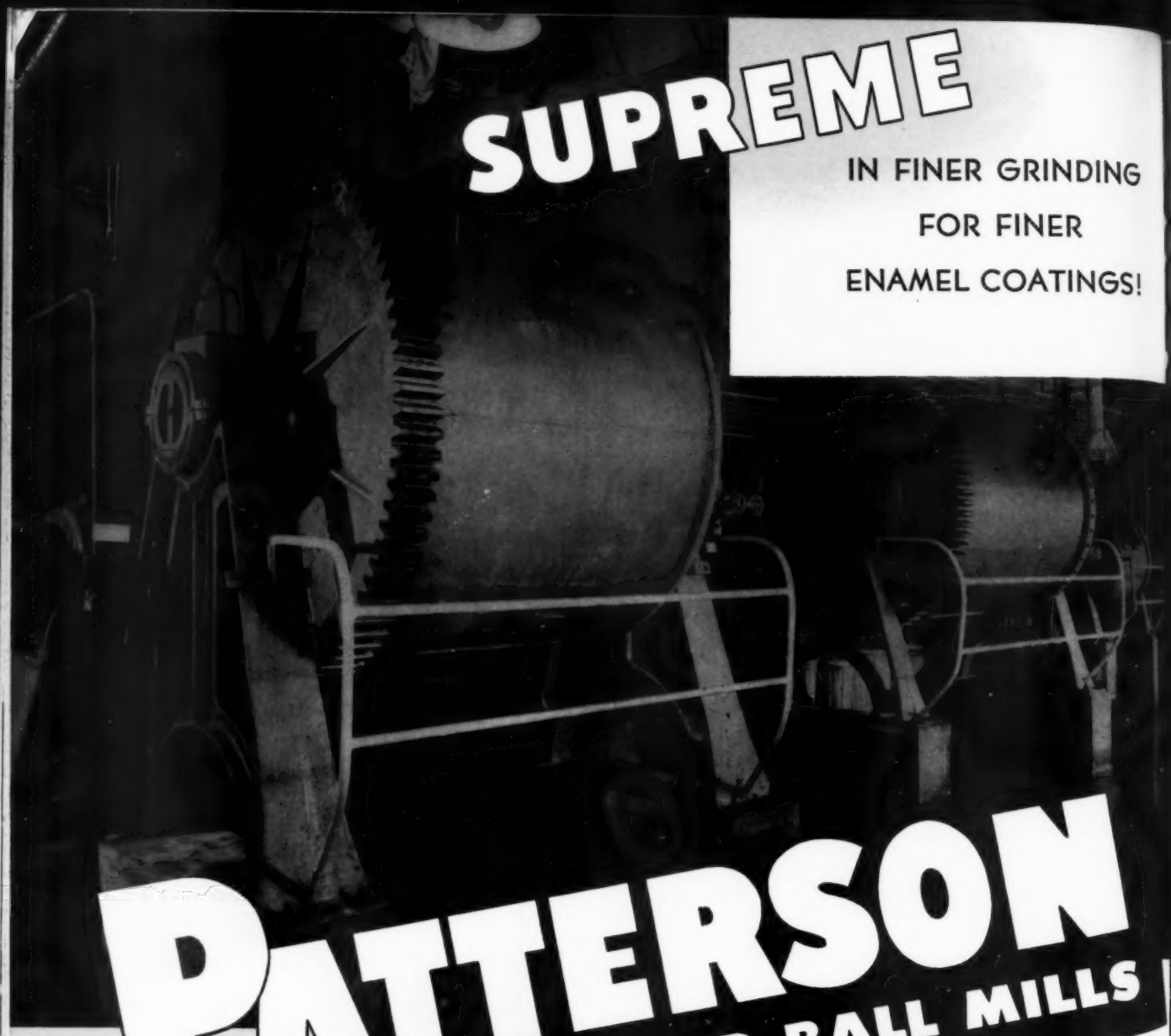

June · 1953
the Magazine of
Appliance and
Metal Products
MANUFACTURING
finish
FROM RAW METAL TO FINISHED PRODUCT



SUPREME

IN FINER GRINDING
FOR FINER
ENAMEL COATINGS!

PATTERSON

PEBBLE AND BALL MILLS

Top grinding performance in the modern mill-room is provided consistently by Patterson Mills—year after busy year. Let us check with you in detail on the Patterson units to exactly meet your production needs.

Richard L. Conner
President

PATTERSON MIXERS

Patterson Type "E" Mixers are standard of the industry for efficient, low cost enamel slip storage. Any desired degree of agitation—belt or motor drive. Write for details.

The Patterson Foundry and Machine Company
East Liverpool, Ohio, U. S. A.

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The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL

ADS OUT

WESTINGHOUSE uses PERMA-VIEW to help sell Ranges

Westinghouse Electric Corporation selected Perma-View "visible baking" as an added convenience for the homemaker and an added sales feature for this fine new electric range. "Visible Baking" joins the many other convenience features which make the range easy to use and easy to sell.

The list of manufacturers who find the Perma-View Oven Door Window an important sales feature for their ranges continues to grow. During 1953 there will be thousands more top-line ranges sold in the United States and Canada with the Perma-View "visible baking" sales feature than during any preceding year.

Perma-View engineers will assist you in selecting the proper window for your oven door. From then on, it's easy. Windows come to you ready for assembly line use — "Out of our carton into your oven door." — lending time-saving and space-saving economy on your assembly line.

MILLS PRODUCTS, INCORPORATED
1015 W. MAPLE ROAD • WALLED LAKE, MICHIGAN

MEETINGS

COOKING, HEATING MFRS. MEETING

Institute of Cooking and Heating Appliance Manufacturers, annual meeting and suppliers exhibit, Netherland Plaza Hotel, Cincinnati, June 1-3.

KITCHEN CABINET MEETING

Steel Kitchen Cabinet Manufacturers Association, first annual meeting, The Greenbriar, White Sulphur Springs, W. Va., June 4-6.

ELECTROPLATERS MEETING

American Electroplaters Society, 40th annual convention, Benjamin Franklin Hotel, Philadelphia, June 15-18.

BASIC MATERIALS SHOW

Exposition of Basic Materials, Grand Central Palace, New York City, June 15-19.

WELDING EXPOSITION

American Welding Society, all-welding exposition, Shamrock Hotel, Houston, Texas, June 16-19.

SUMMER HOMEFURNISHINGS MARKET

International Homefurnishings Market, The Merchandise Mart and American Furniture Mart, Chicago, June 22-July 2.

ASTM ANNUAL MEETING

American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 29-July 3.

HOUSEWARES SHOW

National Housewares Show, Auditorium, Atlantic City, N. J., July 13-17.

HOME LAUNDRY MFRS. SUMMER MEETING

American Home Laundry Manufacturers Association, summer meeting, Grove Park Inn, Asheville, N.C., July 26-29.

THE finish spotlight

ADS OUT

Designed like a super-market, Sears, Roebuck and Co.'s new Coldspot "Super-Mart" refrigerator brings the convenience and efficiency of a modern food store into the home. The 11.4 cubic-foot unit stores food in the same way that departments are arranged in a super-market. This new electric household refrigerator, with the freezer chest located at the bottom, also features automatic defrosting.

Five-car train used in tour of General Electric's Appli Park is shown rounding a bend past the boiler h

Conference on appliance controls

meeting in Louisville includes trip through Appliance Park

(illustrated with finishfotos)

REPORTED BY *Matt Heuertz* • ASSOCIATE EDITOR

LOUISVILLE, Kentucky, was host for the 1953 Appliance Technical Conference, held at the Seelbach Hotel, April 22-24. The first of these conferences, which are growing in importance each year, was held just three years ago in Cleveland *(see August, 1950,* finish).

Sponsored by the AIEE Committee on Domestic and Commercial Applications, this year's conference was held in conjunction with the Southern District meeting of the American Institute of Electrical Engineers.

The joint meetings were opened with a general session at which Charles Farnsley, mayor of Louisville, welcomed the guests. D. A. Quarles, AIEE president and president of Sandia Corporation, Albuquerque, N. M., followed with a report on "Institute Affairs."

E. S. Lammers, Jr., of Westinghouse Electric Corp., Atlanta, Ga., and vice president of the AIEE Southern District, then presented an address entitled "Engineers in the Making."

Average housewife controls 65 horsepower

Guest speaker at the general luncheon was Keen Johnson, vice president of Reynolds Metals Company, and former governor of Kentucky.

Johnson lauded the electrical industry for its role in making the housewife's job a more pleasant one. Regarding the widespread use of electricity in the home, he pointed out that the average housewife controls 65 horsepower just by pushing switches.

Concerning the availability of aluminum, Johnson stated that current industry facilities are capable of turning out 3,000,000,000 pounds a year — compared to a capacity of 300,000,000 pounds in 1939. He then pointed out how aluminum could be used advantageously by the electrical industry to replace more expensive and less plentiful raw materials.

Trips through industrial plants

The three-day meeting included a series of inspection trips through various industrial plants in the Louisville area. Featured was a tour of General Electric's new Appliance Park (see page 68).

Other scheduled plant visits included: American Radiator & Standard Sanitary Corp., International Harvester Co., American Air Filter Co., Gunnison Homes, Inc., Girdler

Corporation, Louisville Gas & Electirc Co., The Mengel Company, and Colgate-Palmolive-Peet Co.

APPLIANCE CONTROLS SESSIONS

Theme of this year's Appliance Technical Conference was "*Appliance Control Components.*" Presiding at the first conference session was T. H. Cline, of Newark Stove Co., Newark, Ohio, and chairman of the AIEE Committee on Domestic and Commercial Applications.

Speakers and their subjects included: "*New Oil-Burner Heat Control*" by R. W. Gustafson, General Electric Co., Morrison, Ill.; "*Evaluation of Performance for Appliance Controls*" by G. C. Pearce, Frigidaire Division of GMC, Dayton, Ohio; "*Reversed Thermostat Metal*" by R. M. Sears, General Plate Division, Metals & Controls Corp., Attleboro, Mass.; "*Electrical Contacts*" by Frank Spayth, P. R. Mallory Co., Indianapolis, Ind.; and "Fundamentals of Bimetal Performance" by C. F. Alban, W. M. Chace Co., Detroit.

Presiding at the second session was T. T. Woodson, of General Electric Co., Louisville, general chairman of Appliance Technical Conference, and chairman of the AIEE Sub-Committee on Domestic Appliances.

Speakers and their subjects included: "*Kitchen Layout Studies*" by A. P. McNamee, McCall's Magazine, New York City; "*What Does Design Mean to the Customer?*" by A. N. BecVar, General Electric Co., Louisville; "*Static Non-Linear Elements for Appliance Control*" by B. H. List, Battelle Memorial Institute, Columbus, Ohio; "*Dishwasher Controls*" by G. H. Wotring, General Electric Co., Louisville; and "*Grounding Plugs for Appliances*" by G. C. Mapelsden, General Electric Co., Bridgeport, Conn.

The concluding session was devoted to a symposium on the "*Role of Fuses, Circuit Breakers, and Thermal Overloads in Appliance Protection.*" Moderator was M. M. Brandon, Underwriters Laboratories, New York City.

Participants in the symposium included: W. H. Farrell, Underwriters Laboratories, Chicago; F. G. Von Hoorn, General Electric Co., Bridgeport; E. P. Jastram, Spencer Thermostat Co., Metals & Controls Corp., Attleboro, Mass.; J. C. Lebens, Bussmann Mfg. Co., St. Louis; Arthur Steele, Littelfuse, Inc., Des Plaines, Ill.; and G. W. Heumann, General Electric Co., Schenectady, N. Y.

Oil-burner controls

Gustafson described a new thermal-type timer for use on oil-fired domestic heating equipment. At the end of World War II, according to the speaker, General Electric made an analysis of the domestic heating control field, and came up with a thermal-type timer which could be used with remote flame detection or built into the stack switch-type of control.

"Its inherent cost was low," stated Gustafson, "and several innovations indicated that simplicity and ease of installation would be attained. The transformer and relay were combined in one device; the thermal timer was completely enclosed, and ambient compensated; the flame detector became a simple clutch-operated device divorced from all duties except flame detection."

Evaluation of performance for appliance controls

Talking from the viewpoint of an engineer responsible for the overall performance of an appliance, Pearce discussed test techniques and devices developed and used over the past 9 years by Frigidaire in their "constant search for more reliable appliance control components."

Regarding appliance timers, Pearce stated "We are constantly testing not only the timers used on our products, but practically all makes available that we might use. The long duration of the tests makes this imperative. Knowing that the motor manufacturers have similar test programs, it is natural to ask why we have spent money on this project for 9 years — when we neither make nor sell the motors. We have an independent check on motor life under conditions of our own choosing, and an excellent idea of the relative motor performances for use in future products. We have also determined that a constant increase of motor life, under test conditions, has been accompanied by a corresponding decrease in servicing on our products."

He said that Frigidaire is now beginning to see a ratio between the test life of timers and their average service life. "We keep our sources informed of performance of their samples, along with hints that longer motor life is still our objective, and

Keen Johnson, left, Reynolds Metals vice pres., with E. S. Lammers, Jr., of Westinghouse, and vice pres. of American Institute of Electrical Engineers' Southern District. Johnson was guest speaker at the general luncheon.

Speakers at the opening session at the Appliance Technical Conference, left to right: R. M. Sears, General Plate Division, Metals & Controls Corp.; C. F. Alban, W. M. Chace Co.; T. T. Woodson, General Electric Co.; T. H. Cline, Newark Stove Co.; R. W. Gustafson, General Electric Co.; Frank Spayth, P. R. Mallory Co.; and G. C. Pearce, Frigidaire Division of General Motors Corp.

a desirable thing for the appliance industry." He remarked that the tests have not cost much for equipment, adding that "the file on small synchronous motors represents several thousands of dollars in testing time."

Regarding accelerated tests for refrigerator controls, Pearce said that it has been found useful to check calibration at fixed numbers of cycles. "Greatest changes are almost always found in the initial 10% of a run. Once the shape of the curve is known, the drift can almost be projected. Ultimate life is determined either by drift exceeding tolerances for correct operation of the appliance for which the control is indicated, or by abrupt failure of some part which makes the control inoperative."

Accelerated tests are not necessary for controls on washers and dryers, Pearce pointed out. "Since 2000 running hours are considered adequate life for these devices, it is our practice to endurance-test the entire machine under load. By running 24 hours per day, the test can be completed in 90 days. This is an ideal test for controls as the electrical loads are exactly right, and so are other conditions affecting operation—such as vibration, moisture, and temperature changes."

Good testing equipment necessary

A good technique on the border between engineering and quality control is to provide the best possible testing equipment. This equipment must have capacity to permit 100% checking in the initial stages, or as long as necessary to satisfy all concerned that the controls are "grooved in" and functioning as intended, stated Pearce.

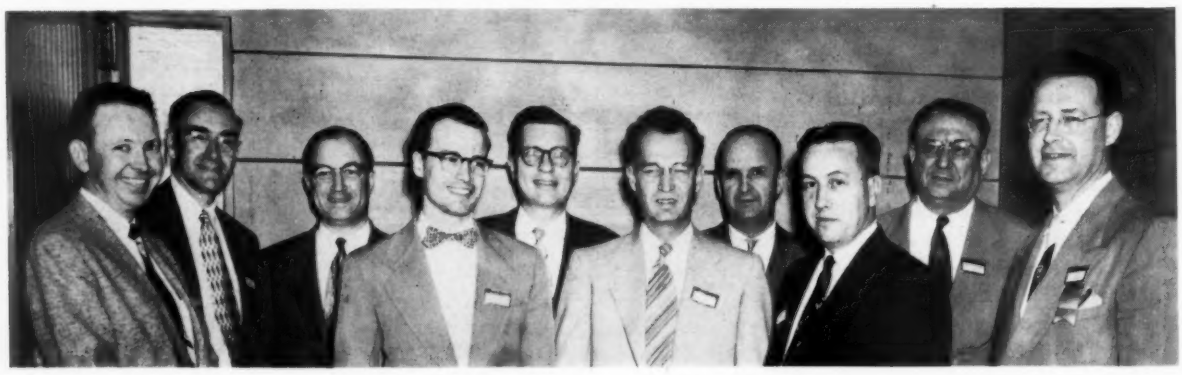
Dishwasher controls

In discussing dishwasher controls, Wotring, of General Electric, reviewed patents for mechanical dishwashers which go back to 1850. One patent, issued in 1865, had a type of construction to be found in the largest number of household dishwashers in use today, he stated. Continuing, he pointed out that back in 1922 a patent was filed for a dishwasher having an automatic sequencing control.

A patent issued in 1939 appears to be the first one issued on a fully-automatic all-electric control of the type now in general use, in which a stack of cams operate switch con-

to Page 68 →

Some of the members of the AIEE Committee on Domestic and Commercial Applications who attended the Appliance Technical Conference, left to right: H. W. Kelley, REA; H. H. Watson, General Electric Co.; R. F. Zimmerman, Frigidaire Division of GMC; J. H. T. Miller (secretary), Cleveland Electrical Illuminating Co.; W. R. Crawford (chairman of Sub-Committee on Farm Electrification), General Electric Co.; R. W. Fauquet, Sears, Roebuck and Co.; R. S. Gardner, AIEE headquarters staff; T. H. Cline (chairman), Newark Stove Co.; B. H. Martin, TVA; and T. T. Woodson (chairman of sub-Committee on Domestic Appliances), General Electric Co.



Dryer assembly operations at Maytag

ADS OUT

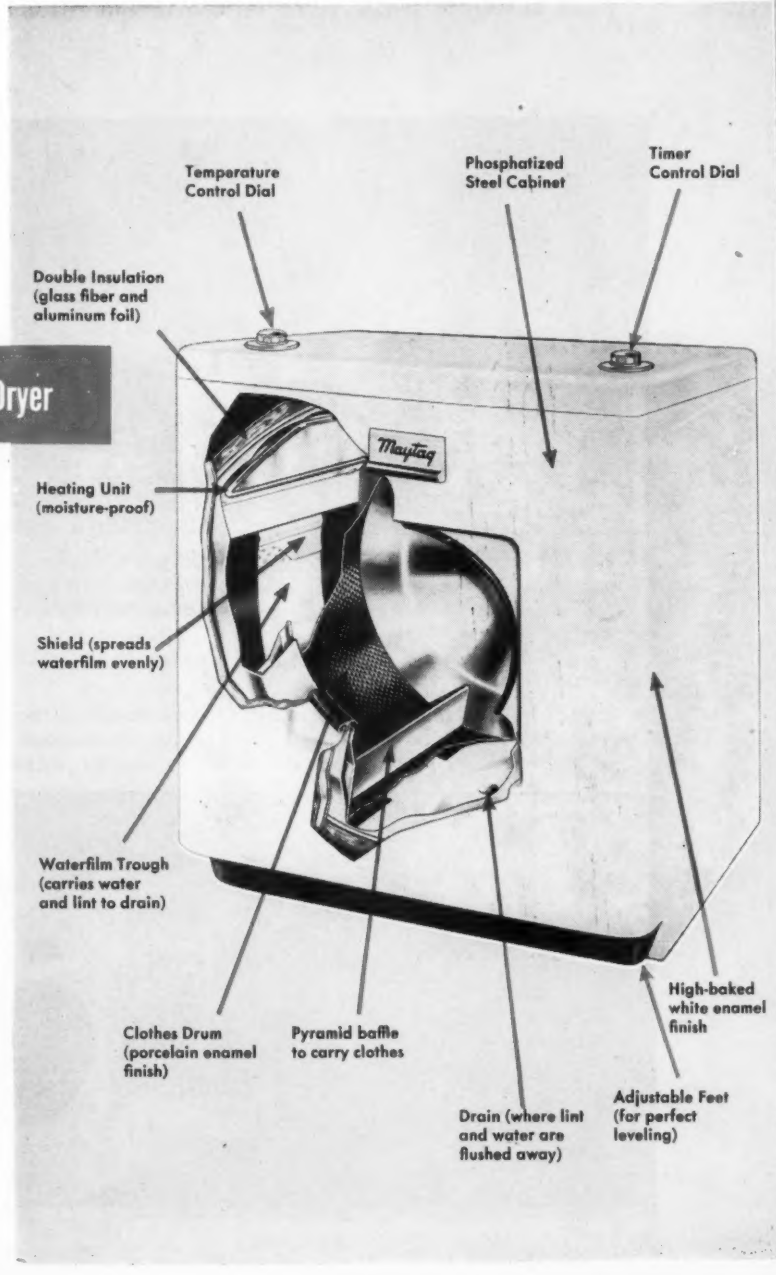
photo story presents the highlights of testing and assembly

THE Maytag Company, Newton, Iowa, has been following the development of clothes dryers for many years. During this period, their research and development division tested many models. In addition, scientific studies of unusual methods of drying clothes were made by outside consulting technical organizations under the sponsorship of Maytag's research and development division, headed by Tom R. Smith, vice president in charge of research and development.

Several models of dryers were designed and constructed prior to the design of the present dryer which was put on the market recently.

The following photo story presents highlights of testing and assembly of the new Maytag dryer which is being manufactured in the company's Plant 2, in Newton. When this plant was built in 1949 for the production of automatic washers, part of the plant area was laid out to accommodate dryer production. (A complete series of articles on production of automatic washers in Plant 2 appeared in the September, October, and November 1951, and January and February 1952, issues of *finish*.)

As in the production of automatic washers, there are many, many manufacturing steps in the production of clothes dryers. The photos on the following pages show the assembly line operations — the final phase of the manufacturing process.



SPECIFICATIONS • Maytag Automatic Dryer

DIMENSIONS: Height 36", Width 31½", Depth 26½".

WEIGHT: Approximately 211 pounds.

CAPACITY: 18 pounds wet clothes, 9 pounds dry clothes.

DRYING TIME: Varies with type of clothes and amount of water in clothes.

TIMER: Sets for any time up to 110 minutes plus 5-minute cooling period.

THERMOSTAT: Adjustable to hold temperature at any point between 150°F for nylon and 190°F for cotton.

DOOR SWITCH: Shuts off heat, motor and timer when door is opened.

INTERIOR LIGHT: 40-watt bulb lights dryer interior when door is open.

FINISH: Outside—white high-baked enamel—phosphatized to resist rust. Drum—porcelain enamel.

MOTOR: 1/6 H.P. with built-in overload protection.

HEATING ELEMENTS: Two immersion type U-shaped elements unaffected by moisture.

ELECTRICAL RATING: 230 volts AC, 60 cycle, 4800 watts.

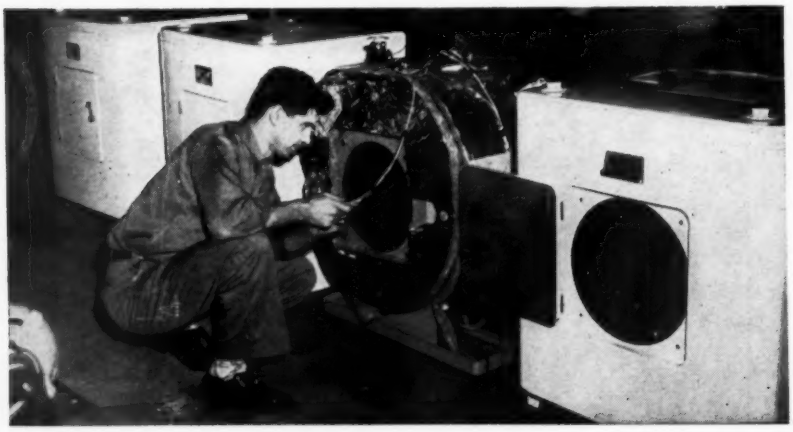
LUBRICATION: Permanent, needs no oil.

WATER CONSUMPTION: Four pints cold water per minute of operating time.

1. *During development of a product, such as the clothes dryer, tests are carried on in the research and development division. If the dryer is found lacking in certain areas, engineering adjustments are made.*

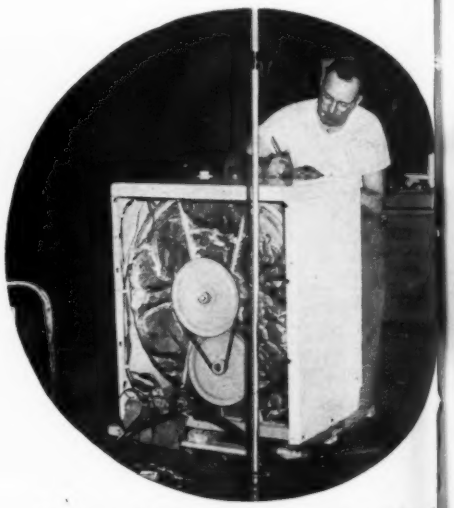
2. *In the product testing laboratory, machines are checked from a sales standpoint, with performance statistics rated against those of competitive dryers, as well as against standards set up by Maytag.*

3. *In the factory engineering department, production-line dryers are given grueling tests which concentrate attention on construction. Machines are run ten hours per day, and are constantly checked for performance.*



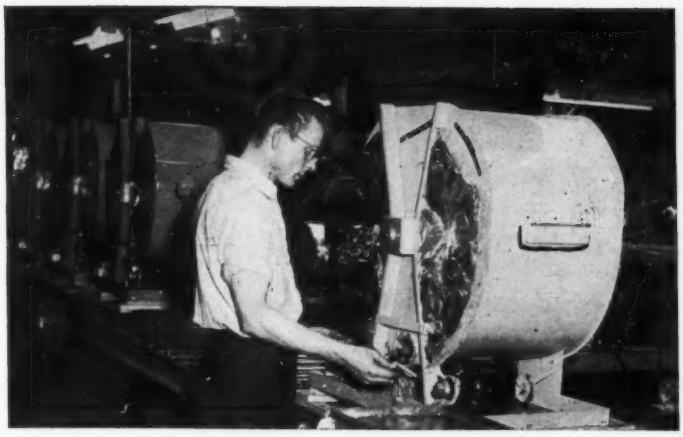
4. *Assembly begins with crate bottom fas-tened to the base frame. Next step is mount-ing motor on base frame.*

7. *Porcelain enameled drum arrives from an al assembly line, and is placed inside cas ratory*



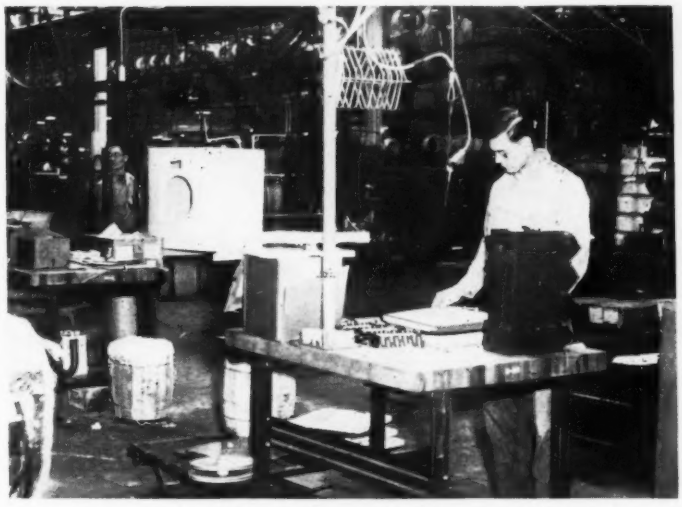
11. *Assembled dryer reaches inspection st tion where appearance is checked, and o operations tested.*

5. *Looking across main assembly line to sub-assembly station where pump is mounted to casing.*



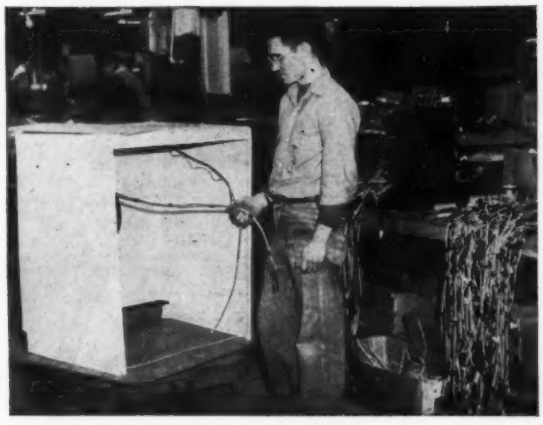
6. *After casing is placed on base frame, two pieces of insulation and part of wire harness are affixed to back of casing.*

...n at right is readying front of casing pre-...atory to sealing it to the rest of casing.



8. *Door is assembled at sub-assembly station. Cabinet is removed from conveyor in background.*

9. *Timer, door switch, thermostat and remainder of wire harness are mounted inside cabinet.*



10. *Entire casing has been covered with insulation, and the cabinet is lowered into position.*

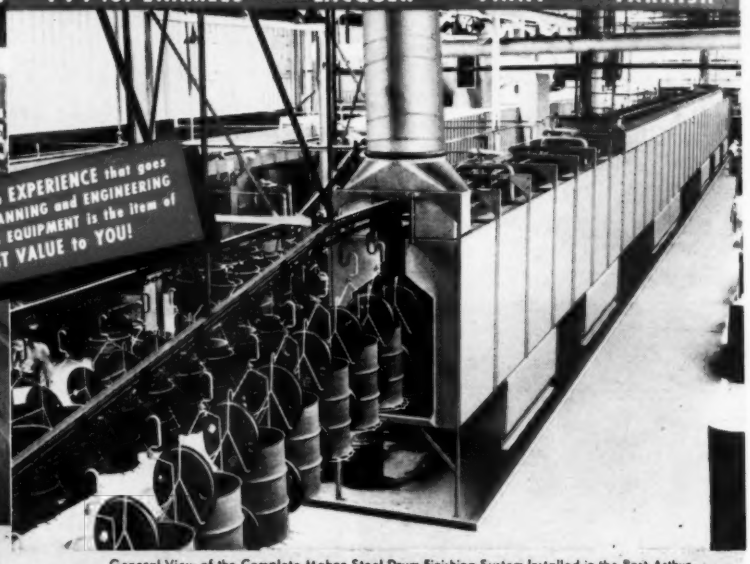
(See packaging photos on Page ST-18)

COMPLETE *Finishing* SYSTEMS

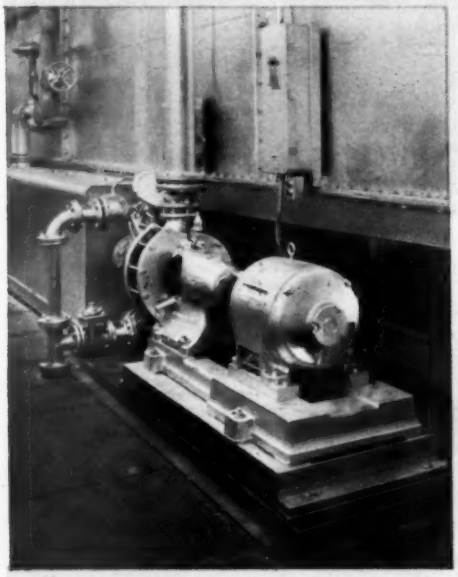
. . . for ENAMELS • LACQUER • PAINT • VARNISH

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

Complete Mahon Steel Drum Finishing System Installed in the U. S. Steel Products Plant at Dalton, Ill. Similar Mahon Installations, including Metal Cleaning, Rust Proofing and Drying Equipment, are also installed in U. S. Steel Products plants at Sharon, Pennsylvania, and at Alameda, California.



General View of the Complete Mahon Steel Drum Finishing System Installed in the Port Arthur, Texas, Plant of U. S. Steel Products Division of the United States Steel Corporation.



One of the large Acid Recirculating Pumps employed in the Pickling and Descaling Stage of the Mahon Equipment illustrated above. Corrosive resistant material is employed for Pumps, all Piping, Solution Tanks, Processing Tunnel Housing and other parts exposed to corrosive materials.

Chemically Clean, Scale-Free, Rust Inhibited U.S. Steel Drums Get their Fine Finish in Mahon Equipment!

In four of its strategically located steel drum plants, The U. S. Steel Products Division of the United States Steel Corporation depends on Mahon Finishing Systems to produce its high quality, 100% scale-free, rust-inhibited steel drums. These drums are absolutely clean, and are protected with a finish which has been processed for maximum adherence and endurance. In the prepainting metal treatment the drum shells and end plates pass through a nine-stage Mahon Cleaning, Pickling and Phosphating Machine—the last stage of which is a chromic acid rinse. These machines are designed with conveyors outside the processing tunnel to protect chain, trolleys and track from the corrosive action of sulfuric acid. Conveyor adapters of noncorrosive material pass through a Patented Mahon Hydro-Hermetic Seal which effectively seals the top of the processing tunnel throughout its entire length. If you are contemplating new finishing equipment, you too, will find Mahon engineers better qualified to determine your equipment requirements and to do the all-important planning and engineering to insure specific results. Regardless of what your product may be, Mahon planned and Mahon built equipment will prove more economical over a period of time. See Sweet's Plant Engineering File for information, or write for Catalog A-653.

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Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning and Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens; Core Ovens, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other units of Special Production Equipment.

MAHON

Factors that influence the adherence of paint films

a two-part article on factors — other than surface preparation — influencing adherence

PART I

by Edward G. Bobalek • ASSOCIATE PROFESSOR OF CHEMISTRY, CASE INSTITUTE OF TECHNOLOGY, CLEVELAND, OHIO.

SOME paint films can be dislodged easily from a surface and others adhere tenaciously. The reasons why films stick to the surface is determined by a variety of factors such as the chemical attraction between substrate and film, the roughness of the surface, and the toughness and other physical properties of the resinous film. A great deal has to do with the condition of the surface.

While the nature of the surface and the surface preparation are critical variables, nevertheless all problems of adherence are not to be explained by analysis of this factor alone. Unless surface preparation is controlled, it is difficult to establish the importance of other factors for which the organic film is responsible. However, let us assume here that the surface preparation is optimum for a particular metal; nevertheless we experience considerable variance in the adherence of different paints or even for the same paint at different times. What does experience show regarding the cause and cure of adherence defects of the type that are caused by the nature of the paint?

The importance of the volatile part of the paint vehicle

The thinner has important influence on the mechanism of film formation that arises from the properties popularly called "solvency." Also, from the very nature of the fact that an evaporation process is involved in film formation, another category of effects can arise. The two effects are difficult to separate, but for the sake of simplicity, let us consider them separately.

Solvency effects—Nearly all liquid organic coatings contain a mixture of two or more quite dissimilar types of resinous materials; for example, lacquers contain nitrocellulose, alkyd and sometimes hard resins derived from resin, whereas baking enamels may contain a mixture of different kinds of alkyd and one or more amino resins. Frequently a mixture of different types of solvents must be used for a thinner if all components of the resin mixture are to be retained in solution. The fluidity and application properties of the paint depend on the choice of solvents used to maintain in solution the very viscous resins.

After the paint film is applied, the thinner evaporates. However, the evaporation rates differ for the different solvents which in the mixture that makes up the thinner — hence during the evaporation process the residue of thinner in the film becomes enriched with one of the components of the original solvent mixture. As the composition changes, the capacity of the thinner to retain the different resins of the binder mixture also changes, and one or the other of the resin components may begin to precipitate in greater proportion than the other. If this effect is extreme, the final film may not be a homogeneous mixture or solid solution of the various resins, but rather a segregation of the resinous components may result. This is called a resin incompatibility effect. Where it is extreme, the film may be rough, cloudy and brittle. This kind of fault is easy to detect, and it is recorded as a total failure of the paint film.

Edward G. Bobalek—

was born in Chicago. He received his B.S. degree in chemistry in 1938 from St. Mary's College (Minnesota); his M.S. in 1940 from Creighton University; his Ph.D. in 1942 from Indiana University.

From 1942-45 he was research chemist for Dow Chemical Co., and from 1945-49 was manager of resin research for The Arco Co. He joined the Case staff in 1949 as asst. prof., and became assoc. prof. in 1951.

Bobalek is technical coordinator for the Cleveland Paint & Varnish Production Club, and is a member of the American Chemical Society, American Inst. of Chemists, and American Inst. of Chemical Engrs.

More difficult to detect are the situations where the segregation of the resin components is only slight. It manifests itself by a slight turbidity of the film in a Tyndall beam of light in clear films, or possibly by a slight dimunition of mirror reflectance of a smooth film in pigmented paints. (Luster defects are not always an indication of resin incompatibility, but this is one of the few observable effects that can be noted when we adjust conditions deliberately so as to produce incompatibility of the resinous constituents.) The feature is especially common in lacquers. These marginal differences in compatibility are important to the over-all effect we call adherence. In one instance a film may be difficult to dislodge and seems to ribbon off the surface when scratched with a knife. In the other instance, where there are incompatibility effects, the film seems to be more brittle and more easily dislodged by scratching, abrasion or impact.

Resin segregation may damage the toughness of the film, or it may affect the stresses or attractive forces at the film-substrate interface. Which is more important is an issue for academic research. However, for the practical purpose of obtaining an adherent paint film it is less important to know why these effects operate than it is to know that the over-all effect can be produced by conditions related to the solvency of the thinner. In practice, it may mean that a thinner mixture may evaporate at one temperature in such a manner that the residual solvent down to the last trace of volatile in the film still has a sufficient solvency to promote formation of a good film. At some other temperatures, however, one of the constituents of the thinner may be lost either too fast or too slowly as compared to the other, and the solvency of the residual thinner in the film may be inadequate to favor formation of a tough and adherent film out of the mixed resins.

"IT'S FOR YOU, SUGAR-LUMP!"

Importance of solvent balance

Also, if one appreciates the importance of a proper solvent balance, great caution would be exercised in making non-specification changes in the thinner for reasons of economy or other reasons. This is sometimes done in substituting one thinner for another when the paint is being diluted to spraying viscosity. While all may be well at the time of spraying, the unbalance may become serious during the evaporation process of film formation, and the properties of the paint film are damaged.

To a greater extent than is popularly recognized, the proper solvent balance for baking enamels is as great a problem as it is for solution type (or lacquer) resins. Baking enamels also are formulated from mixed resins of the curing type. It is important not only that these resins cure during the baking operation, but also that they shall cure in a specific way by interaction with each other. Any conditions that promote self-curing of the individual resins, and which interfere with at least some minimum of reaction with each other, will produce an incompatible film of reduced luster. In extreme cases, decorative properties are lost. In marginal cases, adhesion faults develop, which are manifested as greater brittleness and frequently by poorer alkali resistance, or by greater creep corrosion in the salt spray test, or by a greater blistering tendency in the humidity cabinet.

The conditions that promote a good curing reaction are influenced very markedly by the small quantity of solvent retained in the film through much of the baking interval. If the solvent residue maintains the both resins in one soluble phase, the chance that two or more resins will react together are greatly enhanced.

Two competitive paints may have exactly the same composition in everything except the added trace quantities of low volatile solvent; one of

to Page 75 →

Wha-at! Cleaner than a hound's tooth?

No wonder old Buster is amazed . . . all his life he has proudly thought that "Cleaner than a hound's tooth" was about as clean as they come. Northwest's cleaning specialists know better. They know that even a gleaming, spic and span surface is not to be trusted.

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Remember, the best finishing job on earth can be no better than the CLEANING JOB beneath it. Why not play safe with "job adjusted" Northwest cleaners and personalized service?

Got a problem? Let our cleaning experts help you!

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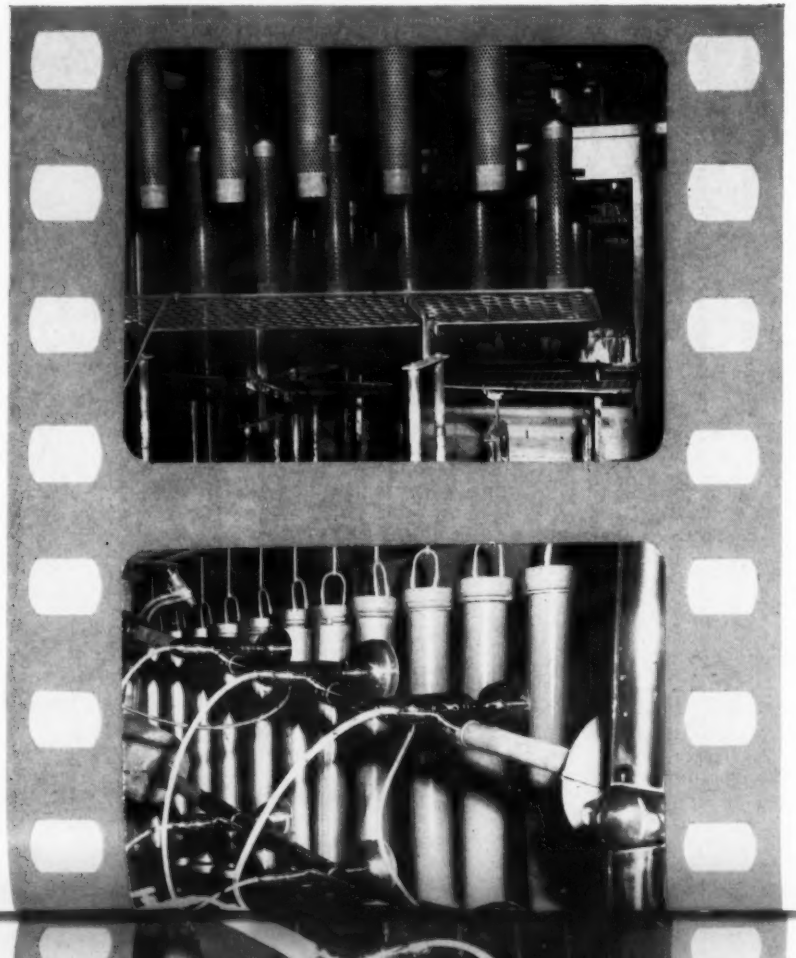
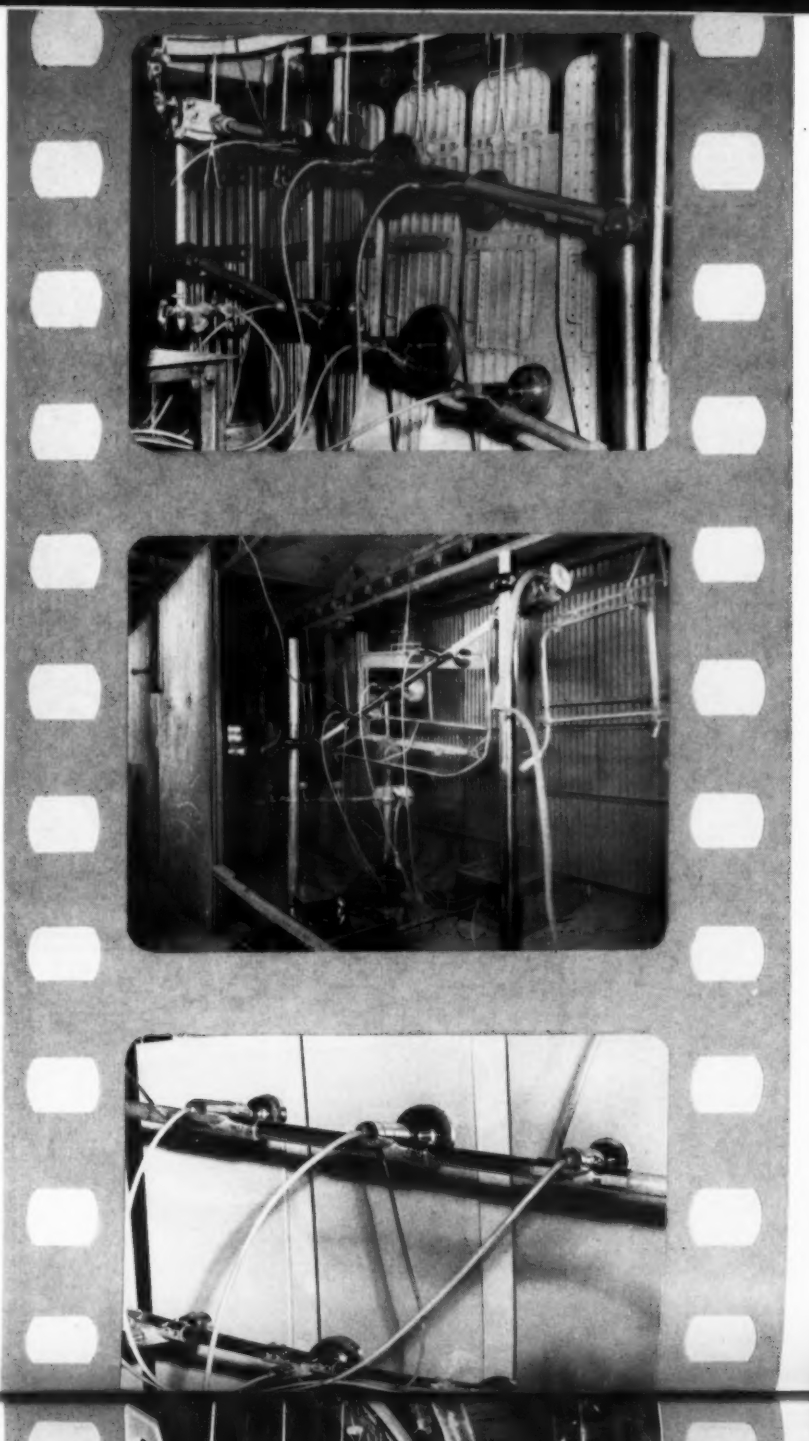
NOTE

These photos are from a 25-minute, 16 mm, color-sound film "Miracles in Painting" explaining a method of electrostatic painting and showing many production line applications.

Available to *finish* readers, the movie is designed for those interested in factory production line painting operations.





Upper right: Process is employed at Geuder, Paeschke & Frey to paint ironing boards. GP&F also uses the process to paint 50-gal. Blitz cans.

Left: Here an electrostatic detearing process at Servel is employed on shell case line — one of four units used at Servel for ordnance and refrigerator parts.

Right: With one of their seven electrostatic units, Arvin Industries paints automotive seat frames at a conveyor speed of 25 fpm.

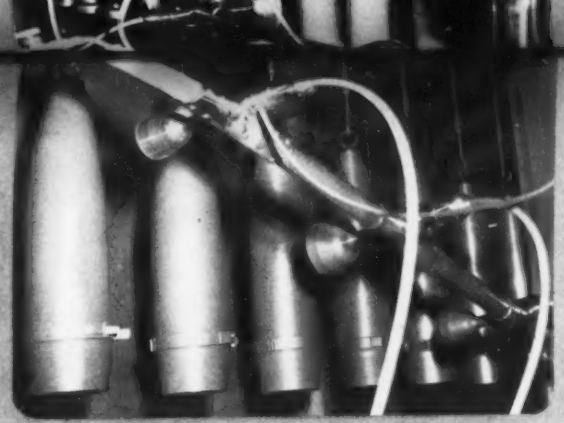
Left: Installation at Aluminum Goods speeds painting of 3-inch, 50 caliber cartridge tanks for the Navy.

Right: Sanymetal increased production on some items by more than 150% with electrostatic spray painting. On toilet partition production — where they change colors from 6 to 8 times a day — they claim a total saving of 8 hours.

Left: Painting 155 mm shells with coat of olive drab at C. A. Dunham

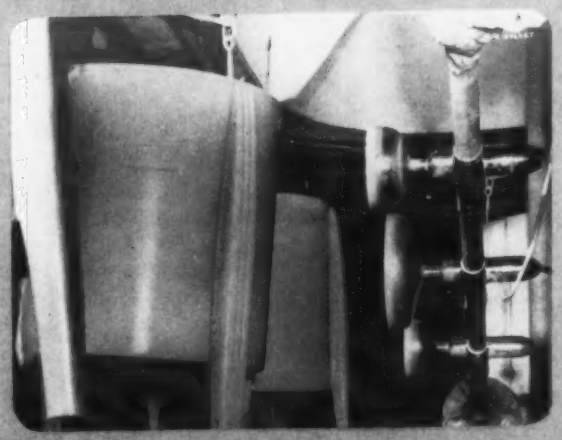
they change colors from 6 to 8 times a day — they eliminated over 8 hours

Left: Painting 155 mm shells with coat of olive drab at C. A. Dunham Mfg. Co. Only a small exhaust is used to remove solvent vapors.

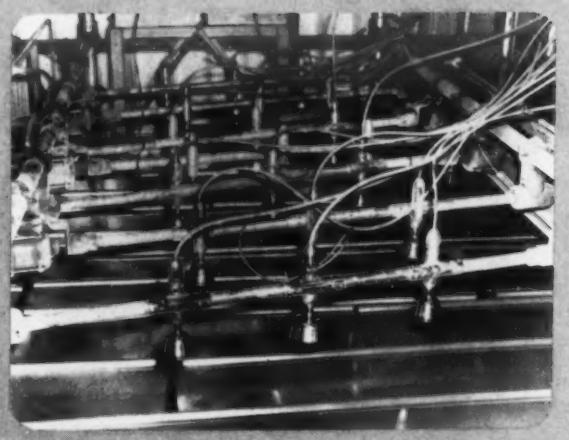


Right: Miro-Flex, a leading manufacturer of traffic and street signs, has jumped production from 90 to 250 signs per hour.

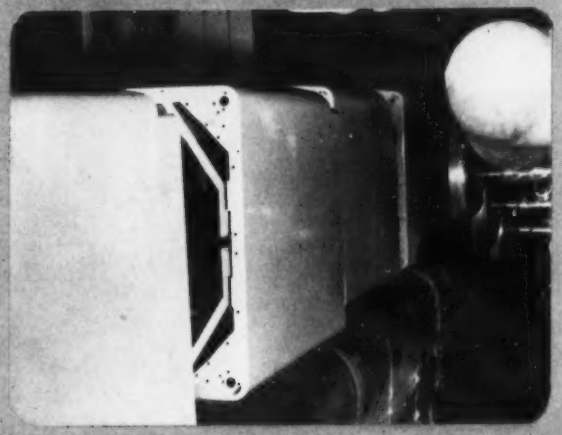
Left: At Speed Queen, prime coat is applied to washer bodies at the first station. After baking, finish coat is applied in two passes. Process is said to product 36% more washers per paint dollar.



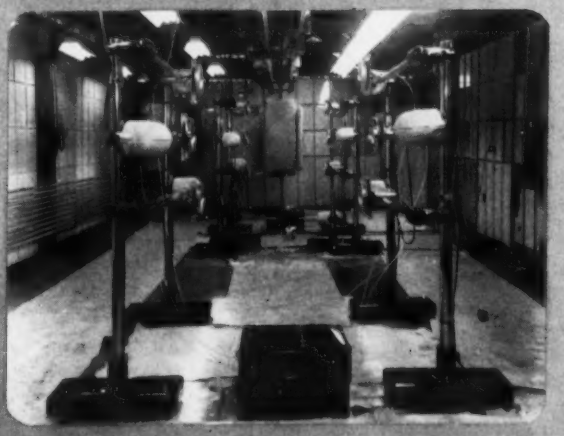
Right: View in Butler Mfg. plant where six units are positioned above and across this 14-foot wide conveyor to paint metal roofing and siding at the rate of 15,000 square feet per hour. Here production and paint mileage were increased 60%.



Left: At Whirlpool, engineers employed the principle of re-spacing work on the automatic washer line. Cabinets are shown as they automatically move from 56-inch to 36-inch centers by means of a "bunching" screw. Note electrostatic units on side — topside units are not shown in photo.



Right: Test laboratory 2-station set-up, served by a bunching and indexing arrangement, demonstrates how the process is suited for painting large cabinets.



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ASTM symposium on porcelain enamels

program at annual meeting of American Society of Testing Materials designed to better acquaint "working engineers" with porcelain enamels and ceramic coatings for metal

EIGHT technical symposiums and many technical papers on a wide range of subjects in the field of engineering materials are on the program for the 56th annual meeting of the American Society for Testing Materials, at Chalfonte-Haddon Hall, in Atlantic City, June 28 through July 2.

Included will be a symposium on "Porcelain Enamels and Ceramic Coatings as Engineering Materials," sponsored by ASTM Committee C-22. Some of the other symposiums, sponsored by other ASTM committees, include: "Metallic Materials at Low Temperatures," "Fluorescent X-Ray Spectographic Analysis," "Radioactivity in ASTM Work," and "Techniques for Electron Metallography."

Dwight G. Bennett, of the University of Illinois and chairman of the C-22 Symposium Committee, reports that their symposium has been set up as a carefully planned and thorough effort to make "working engineers" better acquainted with porcelain enamels and ceramic coatings for metal.

Attention has been given to a number of important, yet diversified fields, to which such coatings are particularly adapted. "These fields cover areas wherein an attractive and easily maintained surface is desired or where metal is subject to deterioration by such things as heat, abrasion, vibration, or close contact with corrosive liquids and gases of many kinds," stated Bennett.

ABSTRACTS

Following are abstracts of papers to be presented before the symposium sponsored by Committee C-22.

Acid Resisting Properties of Porcelain Enamel

By HAROLD WILSON: Vitreous Steel Products Company.

Dwight G. Bennett, chairman, C-22 Symposium Committee

In considering acid attack on ceramic coatings, it should be pointed out that the degree of attack is a relative consideration. In heavy equipment for industrial applications, the prime consideration is service life. In processing C.P. chemicals, the degree of contamination of the product is the important factor. In architectural applications, appearance is one of the most important features.

In selecting an enamel for a given application—where acid attack is a problem—the characteristics of the enamel should be carefully considered (ground coat, lead enamels, zirconium, antimony and titanium).

Comparative attack of various common acids at room temperature (inorganic acids and organic acids).

Effect of temperature and concentration of the acid on resistance to acid attack.

A Study of The Abrasion Resistance of Various Types of Porcelain Enamels

By A. V. SHARON: Chicago Vitreous Enamel Product Co.

The abrasion resistance of a ground coat, antimony opacified non-acid resisting, antimony opacified acid resisting, zirconium opacified, and two titanium opacified porcelain enamel coatings was investigated, using the Taber Abraser.

The abrasion resistance of the porcelain enamel coatings was evaluated by the determination of the weight loss in milligrams at various intervals during the test run. Faxfilm replicas of the abraded surfaces were also made at the same periods of evaluation. From the data obtained from these enamels, it was concluded that the two titanium opacified cover coat enamels exhibited the best wear resistance. The zirconium opacified enamel, having abrasion resistance comparable to the titanium opacified enamels in the early stages of the test, wore down rapidly at later stages, exhibiting wear resistance comparable to the ground coat and the acid resisting antimony opacified enamels. The non-acid resisting antimony opacified enamel with the least wear resistance showed a weight loss almost twice that of the ground coat, acid resisting antimony opacified, or the zirconium opacified enamels. The weight loss of the latter three enamels was approximately five to six times that of the titanium opacified enamels.

Industrial Processing of High Temperature Ceramic Coatings

By J. H. TERRY: Hotpoint Company

The production at Hotpoint of aircraft components with ceramic coatings for high temperature corrosion protection is discussed. The types of equipment of special design required for processing of these coatings is described. Details are given of the procedures used in metal and coating preparation, application, drying and firing of the heat resistant finish to aircraft parts. The use of various coatings on alloys ranging from mild steel to stainless steel and variations in techniques are described. Methods are outlined for laboratory evaluation and process control.

Resistance of Porcelain Enamels to Surface Abrasion as Determined by the P.E.I. Test

By J. T. ROBERTS: Crane Company

One of the most important properties of a porcelain enamel is its ability to resist abrasion; consequently, many tests concerning its measurement have been developed through the years. In searching about for a test which might be suitable for publication as an A.S.T.M. Standard the "Test for Resistance of Porcelain Enamels to Surface Abrasion", a tentative standard of the Porcelain Enamel Institute, published in Oct., 1933, was brought up for consideration and evaluation.

In Section I of this report is presented the results of a literature survey covering the usage of this test in the field. In this section is collected together for analysis all of the favorable as well as unfavorable comments that were issued relative to its worth as a possible standard. In Section II is presented an evaluation of the test from a fundamental viewpoint. The basic principles underlying the causes for abrasion along with some test data showing the abrasive effects of various types of cleaners, and mineral grains on glass surfaces is presented. →

On the basis of this study the test appears to be suitable for publication as an A.S.T.M. Standard.

The Chemical Resistance of Glassed-Steel Process Equipment

By O. J. Britton: The Pfaudler Co.,

Six reasons for choosing glassed-steel equipment are pointed out, including as one of them, its chemical resistance.

Methods and equipment for determining chemical resistance in both laboratory and field are thoroughly described.

Resistance of glassed-steel to well known corrosives like HCl, H_2SO_4 and H_3PO_4 are discussed.

Results of tests are presented for perhaps fifty chemical materials.

Types of glass presently available and an indication of new developments are given.

Torsion Testing as an Aid to The Porcelain Enamel Industry

By Earl Hoover: Westinghouse Electric Corp.

The proposed paper would be based on a paper on torsion testing that was presented by Mr. M. E. Pingel at the last P.E.I. Forum. The paper will be revised to broaden its scope to cover not only torsion testing as an aid in process control but as an aid to research of steel and enamels. Much of the work that is now underway will have been completed, such as correlation work that Mr. George Warren, of the Porcelain Enamel Institute, has conducted with various laboratories, etc.

Analysis of The Expected Benefits Resulting from the Application of Coatings to High Temperature Components of a Jet Engine

By Allen C. Francisco: National Advisory Committee for Aeronautics

Need for high temperatures — turbo-prop engine, turbo-jet engine, ram jet, and rockets.

Limitations on high temperatures — fuel and materials.

Jet engine practice.

Mechanism by which benefits are achieved — corrosion protection, substitution of non-strategic alloys, increased operation temperatures, and miscellaneous effects.

The Strengthening Effect of Porcelain Enamel on Sheet Iron as Indicated by Bending Tests

By E. E. Bryant: Ferro Corporation

Load vs. deflection, as determined by loading an arm attached to a flat enameled sample, indicates the following:

1. The load supported, before exceeding the yield point, is greatly increased by the enamel applied on the compression side. Deflection at the yield point is not changed.
2. Enamel applied on the tension side produces a slight increase of load supported before exceeding the yield point, and a definite decrease in deflection with thick coatings as compared to thin coatings or uncoated iron.
3. The load and deflection changes with enamel on both sides of the iron are as predicted by combining results in #1 and #2 above.

This information indicates that porcelain enamel will produce a definite stiffening effect. There is very little increase in resistance to pure tensile stress when iron is coated with enamel. Possible deflection prior to exceeding the yield point may be reduced, but resistance to deflection is greatly increased. Enamels normally in greater compression (low expansion enamels) produce the greater stiffening effect.

The Laboratory Evaluation of Ceramic Coatings

By Sara J. Ketcham: Naval Air Material Center; and Lt. Stanley G. Benner: Bureau of Aeronautics

This paper will be based on an evaluation of ceramic coating currently available for 321 stainless and 4130 steel with respect to their resistance to oxidation and thermal shock at elevated temperatures. Seven coatings for 321 stainless steel are being tested at 1800 F, while eight coatings for 4130 steel are being tested at 1200 F.

The paper will describe the methods developed and adapted for conducting thermal shock and oxidation tests at the above temperatures. Behaviour of the coatings during these tests will be described, and a final evaluation made on the basis of that behavior.

Needles to say, the coating under test will not be referred to by number or manufacturer. Some general means of differentiation will be devised without divulging the source of the coatings.

Some Examples of the Functional Use of Glass as a Coating for Steel

By G. H. Spencer-Strong: Pemco Corporation

Porcelain enamels are fundamentally very superior protective coatings. Because they combine protection with a highly decorative finish, their protective properties are often overlooked by the general public. The facts are, however, that even with end uses calling for a highly decorative finish, the choice of porcelain enamels is largely based on their superior protective qualities. The present discussion describes the utilization of porcelain enamel coatings in many types of services and discusses the engineering properties of the coatings which have made these uses successful. Such end uses range from architectural and home appliance applications to conveyor equipment, chemical plant equipment, machinery parts, and high temperature applications.

High Temperature Ceramic Coatings as Applied to Aircraft Power Plants

By R. L. Paris: USAF Wright Air Development Center

The Air Force has, for the past several years, sponsored a high temperature ceramic coating research and development program directed toward the practical utilization of such coatings on the hot gas components of aircraft power plants. The results of this program will in many cases be pertinent to many industrial high temperature applications. The objectives as well as the fundamental reasons for initiating such a program will be outlined in this paper.

A summary of the expected benefits to be derived from the use of these coatings by both industry and the armed services will be presented. In general, these benefits can be subdivided into two classifications, the first being the use of such coatings to extend the life of relatively high alloys in such applications as reciprocating engine exhaust systems, high temperature furnace components, etc. where failure is generally a result of oxidation, corrosion, embrittlement, etc., and secondly, the coating of low alloy steels to replace the critical and expensive alloys currently being used in the hot gas sections of gas turbine power plants. In addition to expanding on the aforementioned topics, the properties of these coatings and the position of the industrial engineer relative to this overall high temperature coating program will be presented.

Tensile Tests of Porcelain Enameled Steels

By W. A. Deringer: A. O. Smith Corp.

Tensile tests of various steels show the relationship which exists between the stress and strain required to cause cracking of glass or enamel coatings. An explanation of the results is suggested.

Examples of how this information can be used to advantage in product design and to demonstrate the physical durability of porcelain enamel on steel are illustrated.

The Effect of Temperature on the Electrical Resistivity of Several Silicone and Ceramic Type Coatings

By Simon W. Strauss and Dwight G. Moore: National Bureau of Standards; and Lloyd E. Richards: Crane Company

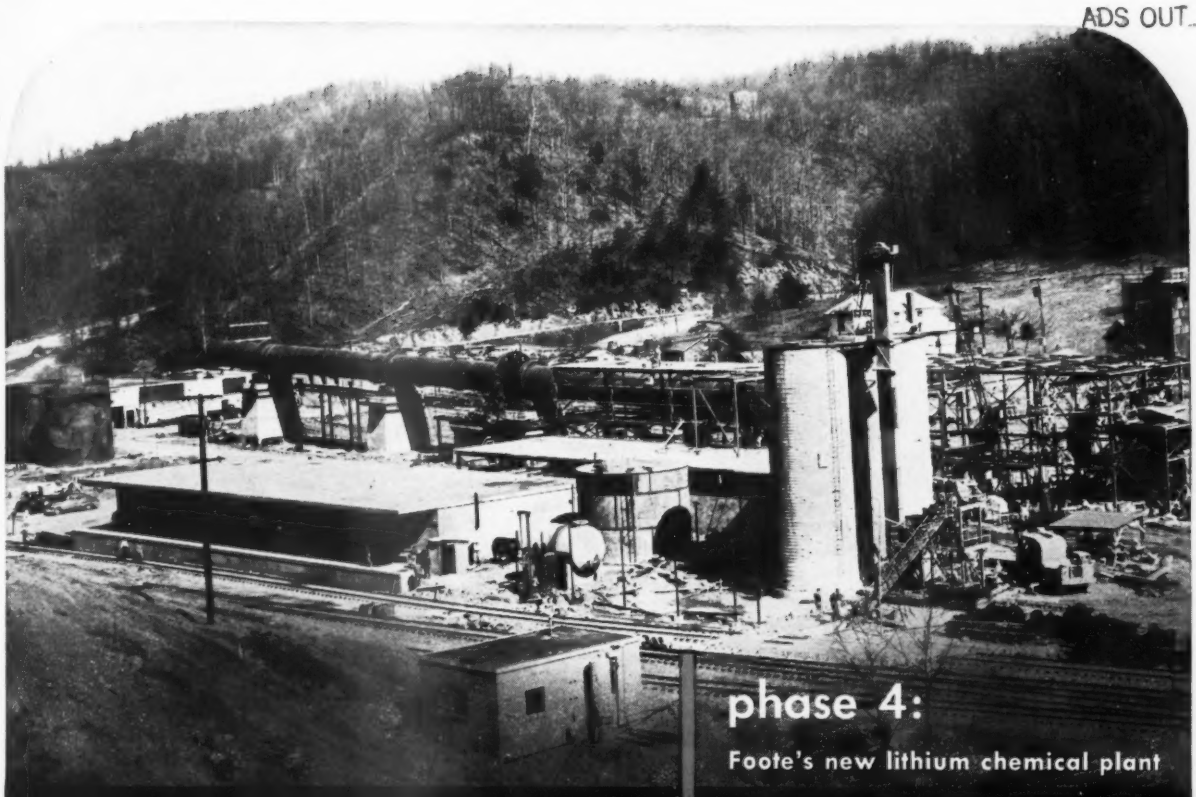
The electrical resistivity of sheet mica, a ground coat porcelain enamel, two alkali-free ceramic coatings, a silicone varnish, and a coating consisting of a silicone varnish mixed with ground mica, were measured in the temperature region 100-500°C and at an applied potential of 200 v DC. A plot of the logarithm of the resistivity vs. the reciprocal of the absolute temperature for each of these materials showed that marked deviations from the Rasch-Hinricksen law occurred only with silicone and silicone mica coatings. The electrical resistivity of all coatings tested was found to be independent of coating thickness and prolonged aging at 200°C. The measured resistivities in ohm-centimeters of the materials when tested at 400°C were: (a) silicone-mica coating, 1.4×10^{11}, (b) mica, 3.2×10^{10}, (c) silicone varnish coating, 2.3×10^{10}, (d) alkali-free ceramic coating, 1.6×10^{9}, (e) ground coat enamel 2.5×10^{6}.

Resistance of Porcelain Enamels to Weathering

By Dwight G. Moore: National Bureau of Standards

A study of the weather resistance of porcelain enamels has been underway at the National Bureaus of Standards since 1939. A total of 784 1-foot square panels are being exposed at four locations selected to represent temperate residential, temperate industrial, temperate salt-air, and semi-tropical residential. The results so far obtained show that most enamels are highly resistant to deterioration under the conditions existing at these four locations and further that these enamels that are not resistant can be rejected prior to installation by simple laboratory tests.

A discussion of the weather resistance of porcelain enamels as compared to other commercial finishes is included.



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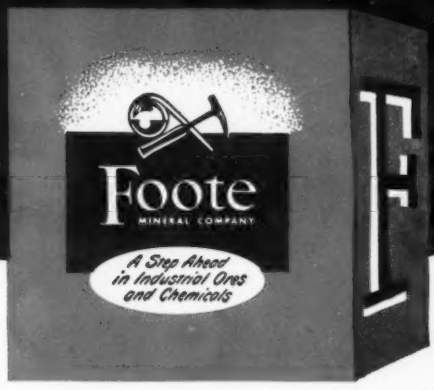

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American Ceramic Society annual meeting

R. R. Danielson elected ACS president for 1953-54

THE 55th annual meeting of the American Ceramic Society was held at the Hotel Statler, New York City, April 26-30. An extensive program of technical papers was presented for the Enamel Division, the division of particular interest to *finish* readers, and there was good attendance for these technical papers and the accompanying discussion periods. Particular interest was evidenced in a series of papers by representatives of the National Bureau of Standards.

Danielson elected president

R. R. Danielson, manager of ceramic service, Metal & Thermit Corp., is the new president of the American Society, and has assumed the duties of the office for 1953-54, following former president W. E. Cramer.

Danielson has been a member of the ACS since 1915, and is one of the initial hundred Fellows of the Society. He has served the Enamel Division as secretary, 1918-24, and as chairman, 1924-25. His Society offices include: a member of the board of trustees, 1923-28, and vice president, 1928-29. Danielson attended the University of Illinois, and received his B.S. and M.S. degrees in ceramic engineering in 1914 and 1916. He served as an assistant instructor in ceramic engineering.

Before joining Metal & Thermit in 1926, he was ceramic engineer, Benjamin Electric Co.; technologist, and chief, Enameled Metals Section of National Bureau of Standards; and research director, A. J. Lindemann & Hoverson Co.

Pemco man named vice pres.

J. Eugene Eagle, a member of Pemco Corporation's sales department since 1946, was elected a vice president of the Society. He has been a member of ACS since 1935. He is also a Fellow and a member of the Institute of Ceramic Engineers. He has held the following Society offices: secretary, Materials and Equipment Division, 1935-36, vice chairman, 1936-37; and chairman, 1937-38. In addition, Eagle has served on several Division committees, and was trustee, from 1942-45.

Other officers elected include: Ray W. Pafford, vice president, Acme Brick Co., president-elect; and Steven M. Swain, director of research, North American Refractories Co., vice president. Robert Twells, vice president of Electric Auto-Lite Co., was elected treasurer.

National Safe Transit chairman is general session speaker

R. F. Bisbee, general chairman of the National Safe Transit Committee and quality control manager for Westinghouse Electric Corporation, Mansfield, Ohio (also technical consultant to *finish*), was one of two speakers selected to address the Society's general session. Mr. Bisbee, who has been a prime mover in the NST program and its relationship to quality control in manufacturing plants, spoke with a subject title "New Horizons."

The other general session speaker was Frederick R. Matson, who gave the Edward Orton, Jr., Fellow Lecture with the title "Ceramic Archeology."

Littleton named honorary member

Jesse Talbot Littleton, vice president and former director of research, Corning Glass Works, was named an honorary member of the Society. He has been very active in the ACS Glass Division.

Meeting of enamelers clubs coordinating committee

During the convention, the Coordinating Committee for the four District Enamelers Clubs held their semi-annual meeting, with all the Clubs having representatives in attendance. The Committee is sched-

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Speaker's table at annual banquet of American Ceramic Society.

finishfoto

R. R. Danielson, of Metal & Thermit Corp., elected president of American Ceramic Society.

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Bird's eye view of typical table at ACS banquet.

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Coordinating Committee — *for enameling industry's District Enamelers Clubs: Seated — Warren, Bur. Stds.; Reynolds, Erie; Ostman, Bettinger; Willis, Pemco; Mackasek, PEI; Spencer-Strong, Pemco; and McIntyre, Ferro. 2nd Row — Gibbs, Inland Steel; Pouilly, DeVilbiss; Nelson, A. O. Smith; and Plankenhorn, U. of I. 3rd Row — Iander, Pacific Coast Ceramic News; Burriss, Ceramic Industry; Bryant, Ferro; Porter, U. S. Steel; Tuttle, Benjamin Electric; Marbaker, Hommel; Sweo, Ferro; and Chase Jr.,* finish.

→ *from Page 40*

uled to meet again during the Shop Practice Forum of the Porcelain Enamel Institute, to be held at Ohio State University, September 16-18.

NOTE

Abstracts of some of the papers presented before the ACS Enamel Division will appear in the July issue.

First prize in Ferro student contest was presented to Frederick D. Olympia (center), of Alfred U., by Dr. G. H. McIntyre, of Ferro. Looking on is Richard G. Rion, second prize winner.

Announce student contest winners

An Alfred University student was awarded first prize in the fourth annual nation-wide Student Contest in porcelain enamel technology sponsored by Ferro Corporation.

The winner was Frederick D. Olympia, who received the $500 first prize for his paper on "Differential Thermal Analysis of Titania Opacified Enamels."

Winner of second prize of $300 was Richard G. Rion, a student at Clemson College. His paper was entitled "An Evaluation of the Use of the Refractory Oxides, Alumina and Silica in Eliminating a Gas-Produced Porcelain Enamel Defect."

The $100 third prize was won by E. C. S. Rao, graduate student at the University of Washington. His paper was entitled "A Theory of Adherence of Vitreous Enamels to Aluminum."

Fourth and fifth prizes of $50 each were awarded to Andrew W. Dorney, of Georgia Institute of Technology, and Donal R. Suder, of the University of Washington. Dorney's entry dealt with the correlation of physical properties of an enamel slip. Suder's entry examined the relationship between porcelain enamel and titanium.

"The papers submitted by this year's winners were all outstanding and the best we have ever received in the contest," said B. J. Sweo, Ferro's director of ceramic research and one of the judges. Other judges were Edward Mackasek, managing director, Porcelain Enamel Institute, and Charles S. Pearce, secretary, American Ceramic Society.

Purpose of the contests, according to Dr. G. H. Mc Intyre, Ferro vice president and technical director, is to stimulate interest in porcelain enameling education.

Registration — *showing some of the overflowing crowd at the registration table on Monday.*

finishfotos

Enamel Division — *showing section of meeting room during technical session's discussion period.*

Steel container manufacturer employs continuous cleaning and phosphatizing

describing how U.S. Steel Products Division, Port Arthur, Texas, produces rust-inhibited drums, free of dirt, grease and scale

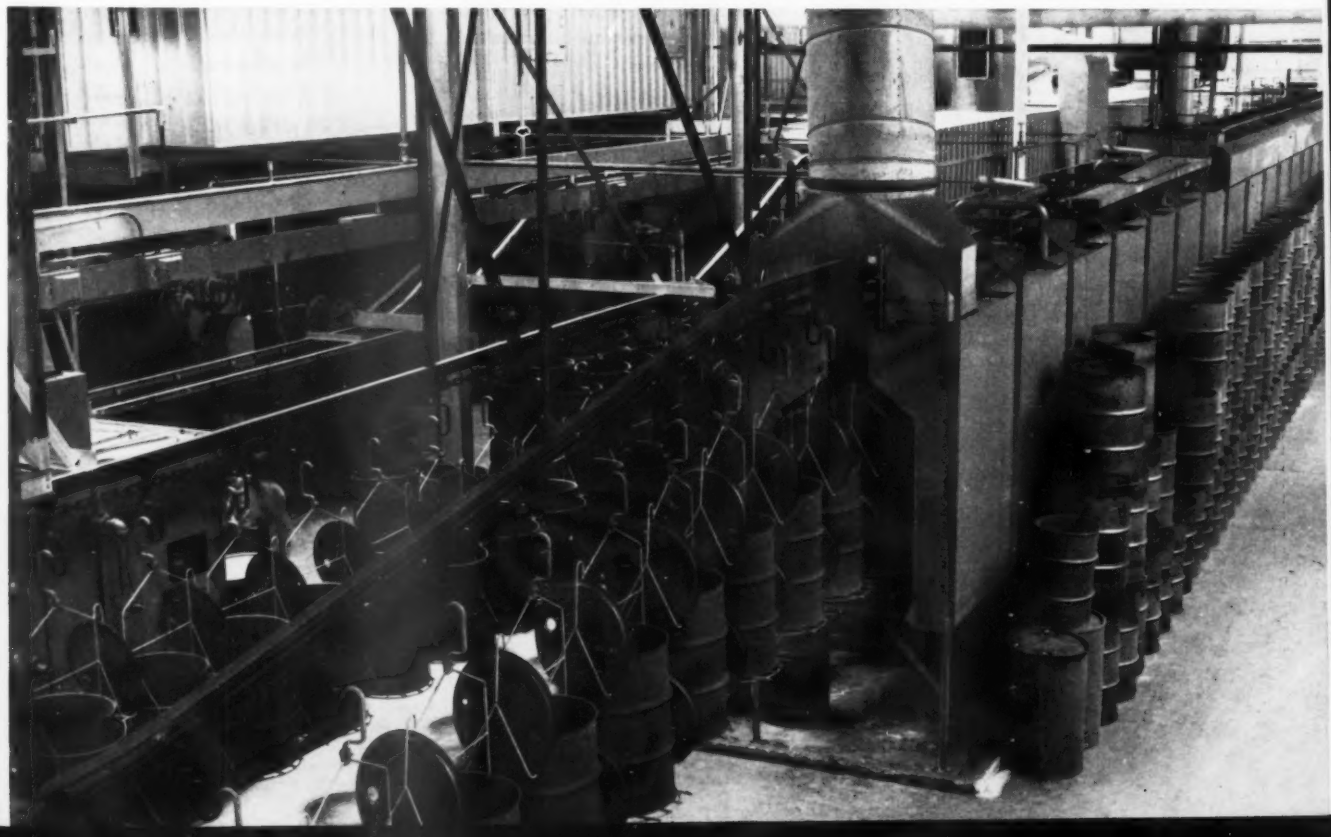
THE United States Steel Products Division of United States Steel Company has pioneered an important development in the steel container industry — chemically clean and protectively coated drums.

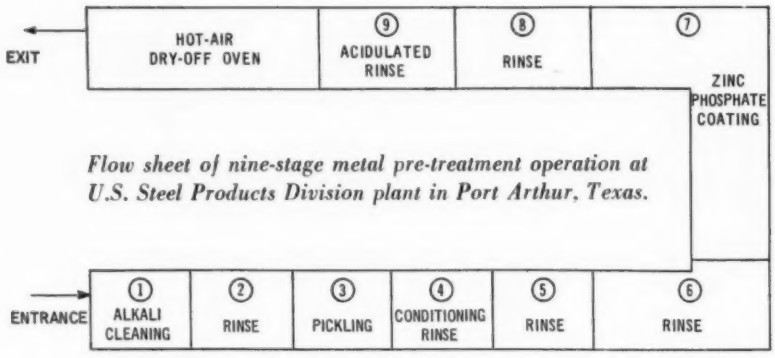
Purchasers can now obtain steel drums that are free of grease and dirt, scale-free, and, in addition, are rust-inhibited by the application of a zinc phosphate coating as required by the Interim Federal Specification for Metal Drums (RR-D-729b). Zinc phosphate finishes on scale-free steel not only meet the specification requirements of Grade I, JAN-C-490, but have been standard practice for many years in the appliance and automotive industries as the most effective and economical pre-treatments for maximum finish durability and under-finish rust-resistance.

Some pre-treatments require only grease removal with mineral spirits or in vapor degreasing equipment; others specify the use of a phosphoric acid wash. However, in the process as used at the U. S. Steel Products plant in Port Arthur, Texas, the drums, fabricated from hot rolled steel, are not only freed from grease but from scale as well, and are then protectively coated with a rust-inhibiting non-metallic crystalline zinc phosphate finish over the entire inside and outside surfaces. The company has determined that a coating of 150-200 milligrams per square foot is the optimum amount — below this the danger of rusting is greatly increased, while coatings much above this range tend to break off under reverse impact conditions. These treated drums are cleaner than their predecessors.

Ordinary cleaning practices, such as handwiping with solvents, mineral spirits, etc. invariably leave a resi-

Power spray washer at U.S. Steel Products Port Arthur plant. Steel drums are carried on a conveyor in specially-designed racks through cleaning, phosphate-coating and rinsing stages. Following this nine-stage pre-treatment operation, the steel drums are assembled and painted.





Flow sheet of nine-stage metal pre-treatment operation at U.S. Steel Products Division plant in Port Arthur, Texas.

due of dirt and particles of scale on the interior. When the familiar "handkerchief test" is applied, a telltale residue of foreign matter is left on the cloth. Claims caused by these contaminating residues have cost drum users thousands of dollars. The same revealing "handkerchief test" applied to containers processed by the new cleaning, treating and finishing technique shows no contaminating or other foreign matter of any kind remaining on the inside of the drum.

The process used at the Port Arthur and other U. S. Steel Products plants to insure an undamaged protective coating over the entire drum surface, involves fabricating the drum shell, head, and bottom then treating these unassembled component parts. This eliminates the possibility of damage to the rust-inhibiting coat caused by the severe forming and fabricating operations as well as damage caused by welding the side seam. Final assembly of drums does not affect the protective zinc phosphate coating.

The durability of both the phosphate coat and the final exterior paint finish hinge largely on the completeness of the scale removal. Although the scale is apparently tenacious, rough handling or other punishment in even normal drum usage can dislodge the scale, taking the interior or exterior coatings with it, and thus contaminate the drummed product or leave the exterior surface open to rusting.

The U. S. Steel Products treating method assures complete scale removal, and yields a greatly improved surface to take and hold interior and exterior coatings and finishes. The bond formed between the coated steel surface and the paint gives a longer-lasting, better-appearing finish particularly adaptable to the bold, poster-type advertising which is recommended for all drums.

Giant power spray washer

Cleaning and phosphate-coating steel drums at the Port Arthur plant takes place in one of the largest power spray washers in the world. The complete sequence of operations is illustrated in the accompanying drawing.

Phosphatizing steel containers involves four operations not at present found in the conventional container manufacturing plant. These are:

1. Grease and dirt removal
2. Scale removal after welding the side seam
3. Phosphatizing
4. Final conditioning by rinsing in an appropriate dilute acid solution.

Phosphate coatings as required here are applied by bringing a balanced zinc phosphate solution into contact with clean, scale-free steel. For the treatment of large numbers of similar products such as these, continuous spray phosphatizing machines are almost universally used.

Replenishment of chemicals, and/or replacement of solutions takes place in the collecting tanks. These include screens to remove foreign particles from the solution, constant level floats to replace evaporated water, etc.

Since phosphatizing is effective on only grease-free and scale-free surfaces, the machines must provide stages or zones to remove these impurities. Finally, they must remove excess coating chemicals and apply to the surface the conditioning treatment called "acidulated final rinsing" with very dilute solutions containing chromic-phosphoric acid, or "acid rinsing," for short. This is very important if highest corrosion resistance and resistance to blistering of the *organic* finish is to be obtained from the coating.

Details of the protective chemical treatments

In the separate zones of the washing machine, appropriate solutions are sprayed onto the work to perform the indicated operations.

The phosphating machine embodies the following steps:

1. *Alkali cleaning.* A heavy duty industrial alkali is used, depending largely on the kind of drawing lubricant to be removed from the stamped heads.
2. *Rinsing* in unheated water, overflowed freely to prevent carrying over of alkali into the pickling stage.
3. *Pickling in sulfuric acid* with the use of a suitable inhibitor.
4. *Rinsing* in unheated water, overflowing.
5. *Rinsing* in unheated water, overflowing.
6. *Rinsing* in unheated water, overflowing.
   Note: This permits a conditioning of the surface to produce finer grained phosphate coatings.
7. *Phosphatizing* in zinc phosphate solution.
8. *Rinsing* in unheated water, overflowing.
9. *Rinsing* in hot, very dilute chromic-phosphoric acid solution.
10. *Drying* in hot air oven.

Steel drums processed as described have the advantage of non-metallic sinc phosphate coating which bonds the exterior paint finish and suppresses under-finish rusting if paint is accidentally scraped off.

View of Swedish Potteries of Gustavsberg, with new bathtub plant shown in center background.

Producing pressed metal bathtubs - Sweden

bathtub plant of Swedish Potteries of Gustavsberg has rated capacity of 150,000 units a year — an example of successful application of modern production methods abroad

by Gösta E. Sandström

Exclusive feature finish

When the 125-year old Swedish Potteries of Gustavsberg, known by collectors the world over for its exquisite ceramic artware, some 15 years ago turned its interest to the production of vitreous china plumbing fixtures, the company grew almost overnight into the largest producer of sanitary ware in northern Europe. Within a short time, the output reached the impressive total of about 150,000 vitreous china toilets and lavatories a year.

Naturally, there soon developed a need for supplementing this production of china fixtures with bathtubs, but the management hesitated about getting involved in the foundry practices necessary for the production of conventional cast-iron tubs. Iron is the ancient bogy of all potters, and to place a major foundry in close proximity to the existing china divisions would have been an invitation to endless trouble.

Under such circumstances, it was only natural that the Gustavsberg management lent a ready ear to the news of the new stamping and enameling practices developed in the United States during the thirties. The war intervened but immediately after the cessation of hostilities, a mission was flown to America to investigate the potentialities of the new methods.

Editor's Note:

Long before Point Four (providing for American Technical Aid to foreign countries) had been formulated into policy, Swedish Potteries of Gustavsberg (outside Stockholm), on the initiative of its own management, had adopted American production methods in their new bathtub plant.

It was during the 1930's that Gustavsberg's management first became interested in new stamping and enameling practices developed in the United States, and following World War II, a mission was sent to America to investigate the potentialities of the methods.

As a result of their survey, the Swedish company's engineering staff collaborated with personnel from Clearing Machine Corp., Ferro Corp., and Mullins Manufacturing Corp. in planning and laying out their new bathtub plant which was ready for production early in 1948.

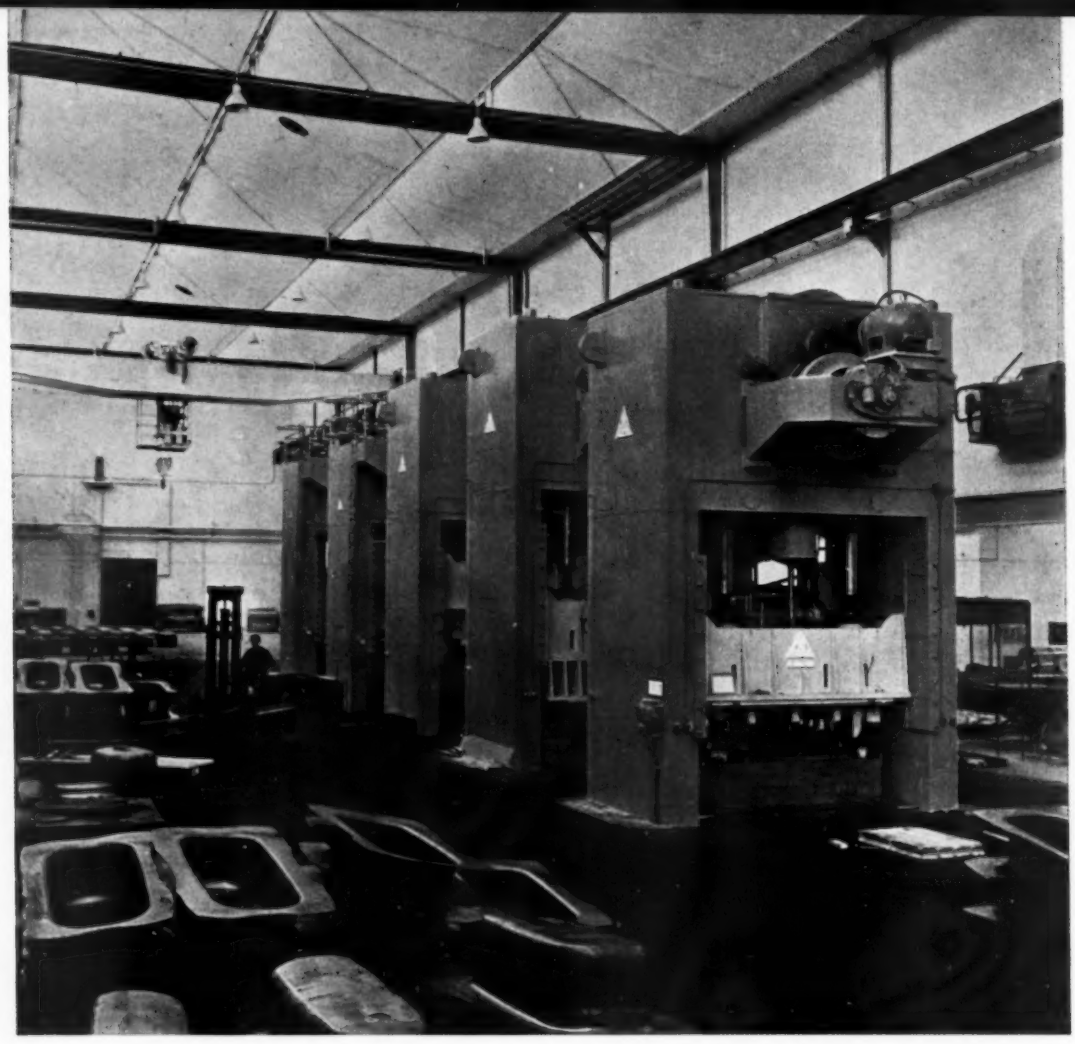
American-Swedish collaboration

As a result of this survey, the planning and layout of the facilities were done by American companies in collaboration with Gustavsberg's own engineering staff. The bulk of the plant equipment from America was delivered in 1947, but owing to the postwar shortages, much auxiliary equipment had to be picked up wherever obtainable.

Despite supply difficulties, building controls, labor and material shortages, the plant was ready for production early in 1948. Subsequently, furnaces and other equipment for the manufacture of enamel were added.

Color conditioning throughout plant interior

As existing today, the Gustavsberg plant is the largest specialized bathtub producer in Europe, with a



These color illustr
show the use of
conditioning in th
tavsberg plant. W
a pale green, with
tural details enhan
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Fabrication equip
a dark green; tools
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accentuated in

capacity of 500 baths per day, or 150,000 units a year. It is a handsome, light and airy building with a color conditioned interior. Considerable effort and expense were invested to obtain a color scheme which, while creating a harmonious mood, also serves as a safety measure. The walls are a pale green, with structural details such as beams and columns enhanced in orange and cobalt blue. In the stamping department, the presses are a dark green; tools, overhead cranes and other moving and dangerous components are in bright yellow. All electrical circuits, controls and motors are accentuated in red. Since the plant was the first one in Scandinavia to introduce a completely integrated color conditioning, there were no specialists available, and the job was therefore given to a prominent artist with experience in the decorative treatment of church interiors.

However, when this beautiful and well equipped plant stood ready to produce in the early months of 1948, it almost immediately ran up against a long series of unexpected difficulties. A protracted drought had emtied the water magazines of the hydroelectric stations in the country and enforced a scheme of power rationing which severely hit this all-electric plant. This difficulty thawed when the snow melted and the spring rains came, but another problem of a much more serious order then appeared.

American and other suppliers of enamel sheet proved unable to deliver to this new but major consumer of sheet, owing to the excessive, pent-up demand which now had suddenly grown out of all proportion to the existing rolling capacity of the mills. But this question soon became merely of academic interest to the Gustavsberg management, because within a few months government currency regulations prevented the import of American sheet, had it been available.

The most serious threat of all was ultimately overcome. A Swedish steel mill offered to develop, in collaboration with Gustavsberg, a mild sheet steel suitable for deep drawing and subsequent enameling, of a width required for the bathtub stampings. In a suprisingly short time, an excellent substitute for enameling iron was developed, and the plant has been operating exclusively on this stock practically from the very beginning.

Since, however, the domestic sheet is somewhat stiffer than the pure iron sheet, it requires an intermediary heat before the blank can be drawn to the full depth of the tub. This heating breaks up the flow through the press line, and the stampings have to be back-tracked to the furnace after the initial draw. Morever, since the sheet is produced on a hand mill, the supply is limited, which has contributed to holding back the output of the Gustavsberg plant at two-thirds

of its rated production capacity.

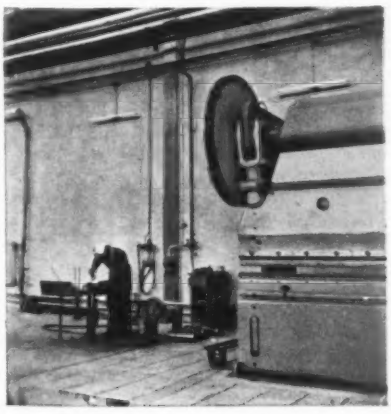
Outline of operations

As presently used, two of the three bays of the factory building, are devoted to the output of bathtubs. The 14 gauge blanks enter the plant through sliding gates in the tall central bay and are transported by fork trucks to the press line in the center of the bay. The first two presses are hydraulically operated 1500-ton units, the first one of which gives the full depth and the second stresses the sides and bottom. In the following three 750-ton mechanical presses, the excess metal is removed, the drain and the overflow (when needed) are punched out and the rim moulded and tucked in.

From the press line, the tubs are conveyed by fork trucks to the pickling plant situated nearby in the next bay. Here they are treated sucessively in nine tanks containing various solutions which prepare the metal surface for the enameling.

The enameling plant is also situated at this end of the bay, separated from the pickling department by a partitioning wall. It is essentially a milling department containing batteries of large-capacity ball mills wherein the enamel frit is ground in water to a fine mesh suitable for spraying. Frit furnaces, enamel storage tanks, the production laboratory and a number of auxiliary facilities are also found at this end of the building.

Upon leaving the pickling department, the baths are hung on a conveyor which carrys them to the spraying pits where they are given a black



Hjalmar Olson, president and general manager of the Swedish firm for the past 15 years.

ground coat of nickel or cobalt enamel and thence through a continuous U-shaped 500 kw drying furnace where the ground enamel is dried in an atmosphere of about 300° F.

From the drier, the baths enter a 1250 kw U-shaped enameling furnace where the ground coat is fused to the metal surface at about 1500° F. After inspection, the ground-coated baths are transferred to a parallel conveyor serving a second enameling line. Here they are given a color coat of titanium enamel in any one of six stock colors, namely white, ivory, jade, Naples yellow, lilac and ebony black. These colors were chosen to match the company's line of color glazes of its vitreous china fixtures.

After drying and firing, at the temperatures given above, the baths are given a third acid-resistant coat before being conveyed to final inspection and routine testing. For lack of Swedish enameling standards, the surface is tested in accordance with American specifications, expressed in the metric system. Thus the company guarantees a thickness of 0.5— 0.6 mm., an impact strength of 0.491 kgm. for concave and 0.425 kgm. for convex surfaces. The reflection of a white surface is permitted to vary from 72 to 80 percent.

A modular bath

The bath thus produced measures 1600 x 700 x 445 mm (63″ x 27 9/16″ x 17½″). It is provided with a symmetrical rim all around which permits the same bath to be used for both right and left hand installations. Its weight exclusive of supports is about 90 lbs. It is usually sold and installed with a detachable enamel front panel, to which may also be added an end panel, stamped from the same stock and similarly enameled.

Only strictly economical and functional considerations have entered into the design of this "modular" bath. In order to gain the economic benefits of long runs, only one model and one size has as yet been produced. To satisfy the requirements of the Swedish plumbing market and, as subsequently proved, most other postwar markets as well, the bath is made higher than in current American designs, although the length and internal width compare favorably with modern American practice. To facilitate shipment and handling, the front is detachable rather than spot welded; in this way the baths can be crated in lots of ten, placed in each other with separators between them. For maintenance purposes, too, the detachable panel has proved convenient.

The capacity of the Gustavsberg plant naturally exceeds by far the normal Swedish, or indeed the Scandinavian requirements. Therefore considerable efforts have been made to work up an export trade, and the Gustavsberg bath is now sold and installed in some twenty countries the world over. Australia, in particular, has installed great numbers of them in connection with her current building boom. The bath also enters as standard in the prefab houses delivered by many Swedish housing industries to the war devastated countries, Israel, Australia and other markets.

Since the baths can be crated into a compact package of ten units, as mentioned before, large savings in costly ocean freight space are obtained and they are readily sold regardless of shipping distance in all except highly protected markets.

Plumbing supply houses on the European continent, particularly the Benelux countries, France and Western Germany, are served by road carrier. The baths and china fixtures

Left: After the bottom and sides have been shaped in the first two hydraulic 1500-ton presses, the trimming, punching, rim folding and other finishing operations are carried out in the three 750-ton mechanical units. From the press line, the bathtubs go directly to the adjacent pickling department.

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are loaded in trailer rigs at the factory and delivered at the door of warehouses situated in some thirty major European cities.

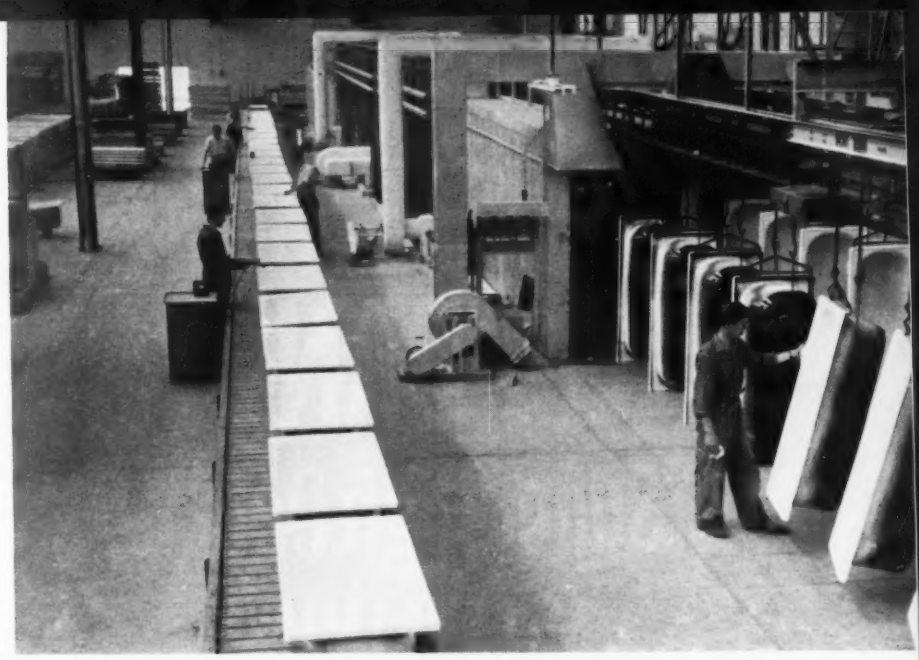
Hospitality to artists

The new enameling facilities have inspired a number of auxiliary manufacturers, the growth and development of which hitherto has been determined by the supply of labor and sheet steel. An interesting and promising line of enamel steel mosaic, originally intended for covering bathroom walls as a substitute for tiling but subsequently found suitable also for many other architectural applications, is fully developed and awaits the installation of automatic facilities to be exploited in full scale operation. Weather-resistant enamel wall plating, balcony rails and other building details have been supplied to architects and builders in recent years, but this line, too, remains in the pilot stage owing to material and labor shortages.

Meanwhile, however, there is a

Center: In the stamping department of the Gustavsberg plant, all transportation of bathtubs is by fork lift truck. A subsidiary company introduced the fork truck to Scandinavia immediately following World War II.

Left: In the pickling department, bathtubs are immersed in a series of pickling baths prior to porcelain enameling. There are tank facilities for nine different baths. Baskets hold ten units.



Right: View of furnace and inspection line. Following firing of the final acid-resistant coat, bathtubs are moved to an inspection line for grading and testing. Baths and front panels are available in seven stock colors matching the color glazes on the company's china fixtures. Crating is done at the end of the inspection line.

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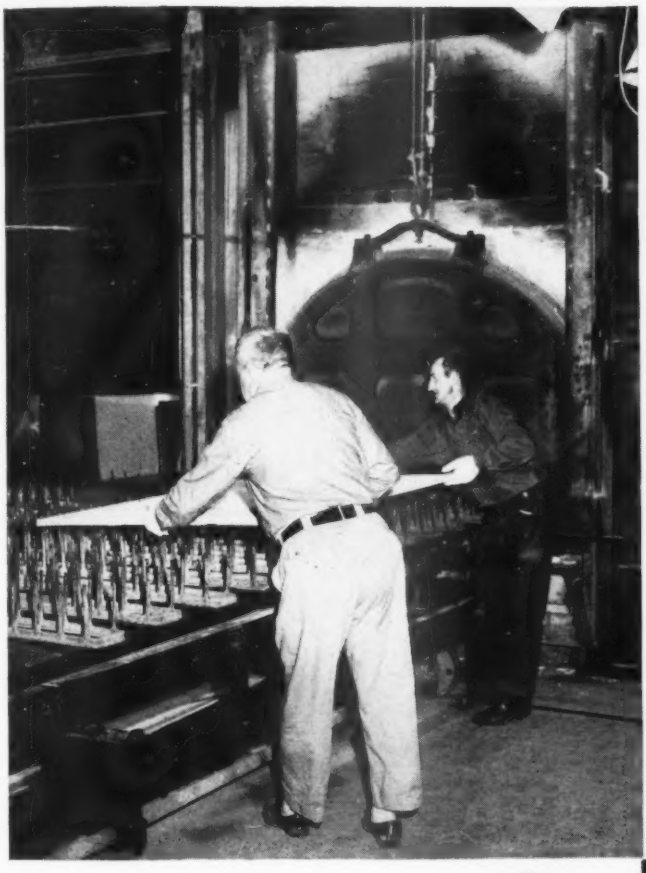
lively artistic interest in the possibilities of the new enameling medium. True to its old traditions of extending hospitality to art potters, the management has offered its new facilities to freelance artists of many nationalities, as well as to its own designing staff, to develop the potentialities of the new wet enameling technique.

The results thus far have been very promising. Enamel decorations by these artists (paintings, placques, murals, etc.) now grace many schools, restaurants and cafes in Sweden and neighboring countries. Of this creative enamel work, at least one piece has already attracted considerable international interest. It is the fountain by the Spanish-American artist J. Junyer erected a few months ago in the garden of the Museum of Modern Art in New York City. It consists of a couple of discarded bathtubs, selected from the factory dump, to which, however, were added a large investment of artistic talent and creative imagination.

Center: In the enameling department, bathtubs are carried by overhead conveyor through the spray pit. Note special ventilated hoods worn by the sprayers. Following drying, the enamel is fused to the metal in an electrical U-shaped 1250 kw furnace.

Right: Plumbers' supply houses on the continent are served by trucks which load at the end of the production line.

"Refractories by CARBORUNDUM have already outlasted others 2 to 1"



...says William Hammond, who has operated this furnace 22 years

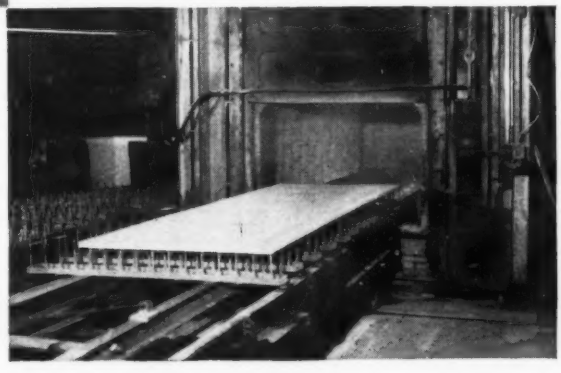
This oil-fired batch furnace has a CARBOFRAX silicon carbide muffle, and MULLFRAX electric-furnace mullite supporting arches. The muffle has had 3½ years' service, and the supporting arches 2½ years. This is now double the life of previous materials used.

William Hammond, operator of this furnace, says: "I'd estimate that these refractories by CARBORUNDUM are still good for a couple of years more. They are far superior to the ones previously used."

Down time has been reduced to one two-week period per two to three years' service. Refractory costs, of course, also have been reduced in proportion to the increased refractory life.

For muffles, support arches, pier facing and leveling brick, grate rests, and burner blocks, check up on super refractories by CARBORUNDUM. They often can increase furnace efficiency, and practically always will cut material and labor costs. Why not write or phone us today?

Operators William Hammond (left) and Charles Ewald (right) load section of sign on rack. This enameling furnace operates 16 hours a day.



Here, the furnace is being charged. Note the CARBOFRAX muffle. It transfers the heat far faster and more uniformly than any other refractory material.

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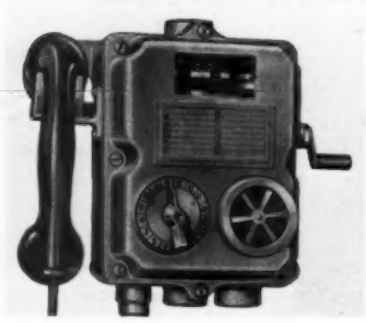
Dept. K-63, Refractories Division — The Carborundum Co., Perth Amboy, N. J.

"Carborundum," "Carbofrax," and "Mullfrax" are registered trademarks which indicate manufacture by The Carborundum Co.

New Supplies and Equipment

F-10. Explosion-proof telephone for industrial plants

New This new explosion-proof telephone for use by industry is sheathed in two sections of aluminum housing flame tight. Unlike ordinary telephones, it is powered by the sound of the human voice alone. The voice causes fluctuations in the magnetic circuit of the phone's transmitter which creates an electrical current. This current, hardly measurable by ordinary electric instruments, is transmitted to the receiver where sound waves are created, reproducing the speaker's voice. The telephone not only provides communication in and around hazardous areas, but also permits communication with other sound-powered telephones within a 30-mile range.

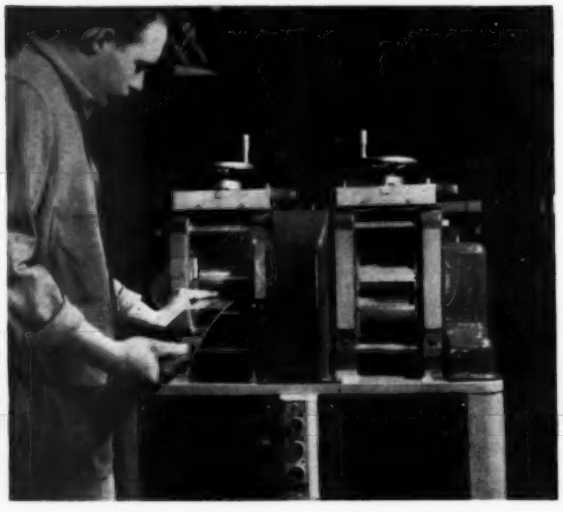


More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form, or write to us on your company stationery.

F-11. Small roll-forming mills with "heavy machine" features

New These small 3 and 4-inch rolling mills can be tailored to meet individual requirements. Rolls are furnished either flat or grooved to produce a great variety of shapes — such as round, square, half-round, diamond, or special shapes. Rolls are also supplied for such purposes as reducing or compacting small tubing sizes. The mills are available with a built-in bull-block to draw wire, or to provide tension during rolling. A variety of assemblies enables one machine to do the work of several. Their compact design permits their use in production shops or laboratories where space is at a premium.



F-12. Zip-on fastener for appliances requiring leveling devices

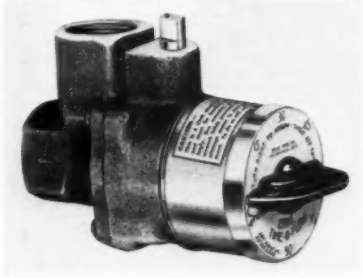
New Material savings and assembly advantages, which this zip-on spring steel fastener offers, can be applied to many products requiring leveling devices — such as home laundry equipment, ranges, refrigerators, desks, office equipment, pin ball machines, etc.

One leading manufacturer of home laundry equipment has cut materials handling in half and speeded up assembly operations on their new automatic washer with this new fastener. The ends of this fastener are turned down to accommodate a 1 5/16-inch diameter rubber pad.

Assembly is simple. The rubber pad slips over the bolt; the fastener zips down the threads until it "bottoms" against the pad. One or two quick turns locks the fastener in place, and prevents the pad from being torn or forced off in transit and handling. Moreover, the low profile of the fastener provides extra adjustment of the leveling leg.

F-13. Appliance timer-valve for fluid shut-off applications

New This new timer-operated fluid control valve for use with a wide variety of home appliances is operated by a mechanical clock. It is a normally closed valve which must be opened manually and which is closed automatically, and with snap action at the expiration of its time setting. It is suitable for use on LP-gas, water, brines, air, steam, and other fluids. It can be operated continuously at 250° F., and in any position.



F-14. Low-speed motors for broilers, ranges, vending machines, etc.

New Made in three sizes, and with output shaft speeds from 1 to 500 rpm, these motors are designed for use with motorized spits on cooking appliances, and other products such as vending and coin-operated machines where motion at slow speeds is desired.

F-15. New foot-operated switch

New The actuating treadle built into the top of this new foot switch required very light foot pressure, and permits fast operation

with minimum fatigue. Access to the internal switch terminals is facilitated by simply removing the front end of the new two-piece top casting (see photo). The red treadle and machine gray design are harmonious, and in keeping with industrial design for plant use.

F-16. Heat exchangers with choice of graphite and metal tubes for pickling and plating tanks

New A new line of heat exchangers is now available with impervious graphite tubes, in addition to the variety of metal tubes

previously used. The graphite tubes can be had in both the tube-and-shell type and the tube-bundle type heat exchangers. By combining any number of tubes, the heat exchangers can be supplied to meet any heat-transfer requirement.

The manufacturer states that now with a choice of graphite and metal tubes, they can offer a heat exchanger ideally suited to heating and cooling any solution used in pickling rooms, any plating solutions, and any solution heating and cooling requirements in the processing industries.

F-17. Vinyl nameplates developed for appliances, instrument panels

New Nameplates for appliances and instrument panels can now be made from a non-plasticized polyvinyl chloride plastic, which is said to resist the action of most solvents, brine and other corrosives. Clearly imprinted names, dials and scales retain their legibility in corrosive atmospheres. The vinyl material is said to be ideally suited for name plates for home laundry equipment and dishwashers, as it resists the action of soaps and detergents.

F-18. Regulator for large volume of air, with minimum pressure drop

New This new air regulator, capable of handling a large volume of compressed air with a minimum of pressure drop, has a capacity of 80 cfm to 100 pounds line pressure. It is available in two models, each basically the same with the exception of inlet and outlet connection arrangements. More sensi-

tive control and reduced pressure losses are said to be achieved by using air pressure against the regulating diaphragm instead of the spring-loaded diaphragm.

The maximum pressure which can be regulated is 135 psi, and engineers have set the maximum line pressure at 300 psi. For trouble-free service, it is recommended that a strainer or filter be installed in air line.

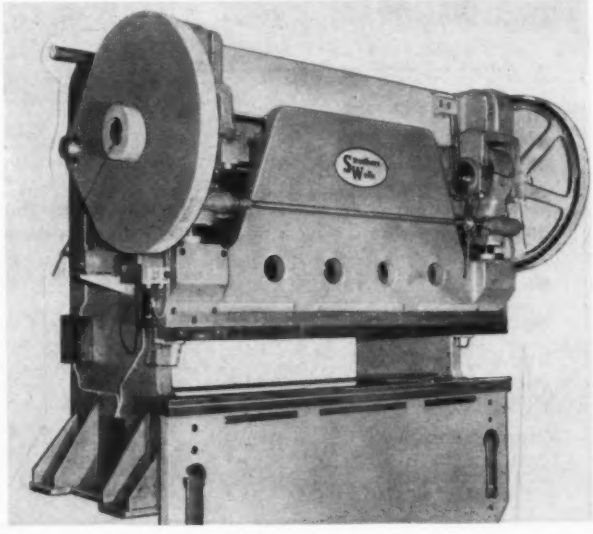
F-20. Cork-topped conveyor belt

New For conveying light materials up steep inclines, a belt with a cork-filled neoprene coating is available in any desired width up to 132". Impervious to oil, this rough surfaced belt is covered with small pieces of cork which grip the material being conveyed, and prevent sliding on inclines of 25° or more.

F-19. Press brake for forming steel up to ¾" thick and 8' wide

New This new 400-ton capacity press will form steel up to ¾" thick and 8' wide. Other brakes in the same line will handle metal in thicknesses up to ⅞" thick and from 4' to 22' wide.

The model shown affords the operator complete control at all times with instant stopping of the ram at any point. It is provided with pneumatic clutch and inching, plus control for a single work stroke with return of the ram to "up" position.



The brakes are said to give excellent results when working to close tolerances and on coining operations. Has automatic force feed lubrication.

Industrial literature

601. Press brake catalog

New This new 72-page press brake catalog is profusely illustrated, and includes photos showing the use of press brakes in forming operations for "wrap around" cabinet sheets for refrigerators and water coolers, steel cones, filing cabinets, trailer parts, roofing. Many operations are shown, including progressive forming, corrugating, curving, notching, punching, etc.

602. Abrasive-belt grinding booklet contains 46 case histories

New "Wherever There's Industry" is a 32-page free book containing 46 case studies on abrasive-belt methods which have effected savings on machining operations in a variety of industries. Contains more than 100 illustrations.

603. Industrial tape dictionary

New This new pocket-size dictionary gives quick, easy identification to some 275 pressure-sensitive tapes available for industrial use. Each tape number is listed in sequence with the manufacturer's name. For each tape there is included a description of its construction. This information, compiled in one booklet, is an excellent aid in determining the right tape for a specific job. The dictionary is available for 25¢.

604. Micarta products booklet

New This free booklet describes the versatility and some of the qualities of Micarta, an industrial plastic capable of taking any shape. It is made in six basic forms: rod, tube, sheet, plate, angle and channel. The material is said to resist compression, impact, vibration, corrosion, moisture, and heat and cold. It reduces noise, insulates, and fabricates easily.

605. Blast cleaning bulletin

New Blast cleaning hose machines, for use with hand-operated cleaning jobs, are described in this 24-page bulletin which points out jobs which can only be accomplished by the use of hand-operated nozzle blast cleaning equipment. A table graphically shows how to match the nozzle to size of abrasive used.

606. Catalog on conveyors

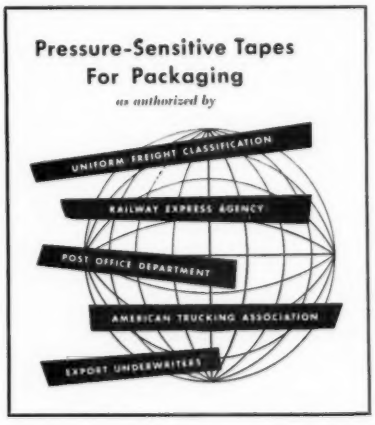
New This comprehensive 56-page catalog illustrates scores of installations of conveyors in industrial plants. It deals with advantages of various methods and techniques. Shows installations of overhead trolley, monorail, roller chain, drag chain, cross platform, slat, rotary turret, automatic transfer and loading and unloading devices, special turntables, and automatic overload cut-outs.

607. Folder on shipping containers for home appliances

New This new die-cut folder shows typical applications of "extra strong" Drumpak knock-down corrugated containers as applied for shipment of typical home appliances and specialty products. This versatile container can be designed in any size or style.

608. Pressure sensitive tapes

New Current shipping regulations on sealing and reinforcing packages with Scotch brand pressure-sensitive tapes are presented in this new six-page folder which contains 13 illustrations showing typical sealing and reinforcing tasks.



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Company _____

Company Address _____

City _____ **Zone**____ **State** _____

Sorensen, chief executive of Deepfreeze.

Ericson joined Deepfreeze in 1940 as production foreman. Since 1948, he was production superintendent of their home feezer plant in North Chicago, Ill. In his new position, he will work with Pat Leone, plant manager, in also supervising production at their new refrigerator plant in nearby Lake Bluff.

FOLLANSBEE SPECIALTY DIV. APPT.

Follansbee Steel Corp. has appointed Fred C. Laubenheimer as sales manager for its Sheet Metal Specialty Division, producers of sheet metal specialties and stampings.

STEEL KITCHEN CABINET ASSN. ANNUAL MEETING

The first annual meeting of the Steel Kitchen Cabinet Manufacturers Association will be held at The Greenbrier, White Sulphur Springs, W. Va., June 4-6.

New officers and two new directors will be elected to take office with the new fiscal year of the Association, starting July 1.

ADMIRAL EARNINGS UP 102% FOR FIRST QUARTER

Admiral Corporation reported a 102 per cent increase in net earnings and a 57 per cent increase in sales for the first quarter of this year.

John B. Huarisa, executive vice president, announced net income of $3,056,878 on sales of $69,191,849 in the first three months of 1953, compared with earnings of $1,515,506, on sales of $43,970,356 in the same period in 1952.

RYAN HEADS ENGINEERING FOR G-E LAUNDRY EQUIPMENT

The appointment of John E. Ryan as manager of engineering for the General Electric Company's home laundry equipment department has been announced by J. H. Goss, department general manager.

Ryan, who had been handling special assignments for the lighting and rectifying department at Lynn, Mass., since October, 1951, will be located at G-E's Appliance Park, Louisville.

DEEPFREEZE APPOINTS ERICSON GENERAL PRODUCTION SUPT.

Earl V. Ericson has been appointed to the newly-created post of general

production superintendent of Deepfreeze Appliance Division, Motor Products Corp., according to L. J.

OHIO STATE U. NAMES ENGINEERING COLLEGE DEAN

Gordon B. Carson, former engineering faculty member at Case Institute of Technology, was named dean of the College of Engineering at Ohio State University. Announcement of his appointment, effective July 1, was made by president Howard L. Bevis, following action by the board of trustees.

TOUSSAINT LEAVES HOME APPLIANCE FIELD

Resignation of Monroe A. Toussaint, vice president and assistant to the president, was announced by B. J. Hank, head of the Conlon-Moore Corp., manufacturer of household laundry equipment. Toussaint leaves to become vice president and general manager of Valley Industries, Inc., Algonquin, Ill., which is introducing a new magnetic dictating and transcribing instrument, declared to be the first magnetic belt recorder perfected for office use.

LP-GAS ASSOCIATION HOLDS ANNUAL CONVENTION

Chalking up a 20% increase over the mark set in 1952 and doubling the attendance of four years ago, more than 3,000 LP-Gas men and women crammed into Chicago's Conrad Hilton hotel May 3-6 for the annual convention and trade show of the Liquefied Petroleum Gas Assn.

The record registration and an exhibit of appliances and equipment, one of the chief drawing cards, are indicative of the recent rapid growth of the LP-Gas industry. More than 200 booths filled the Conrad Hilton exposition hall and annex and spilled over into a connecting hallway. →

"D-Enameling* . . .
a service of economic benefit"

says
H. E. KENITZ
Vice President
Globe-American Corp.

GLOBE AMERICAN CORPORATION
EXECUTIVE OFFICES
Kokomo, Indiana

New Process D-Enameling Corporation
Highland & New Haven Avenues
Aurora, Illinois

Gentlemen:

Your organization is to be commended for having applied production and quality control methods to a process which for years was little more than a means of salvaging defective vitreous enameled parts. In so doing, you have converted D-Enameling into a service of economic benefit to all who process vitreous enameled parts. Your continuing success is our sincere wish.

Yours very truly,
GLOBE AMERICAN CORPORATION
H. E. Kenitz
Vice President

HEK:pmp

The successful experience of Globe-American Corporation typifies that of other appliance manufacturers who have learned how D-Enameling transforms defective enameled parts which were formerly complete loss as scrap into first class production parts that now contribute to the profit picture. As Mr. Kenitz points out in his letter, D-Enameling is a service of economic benefit.

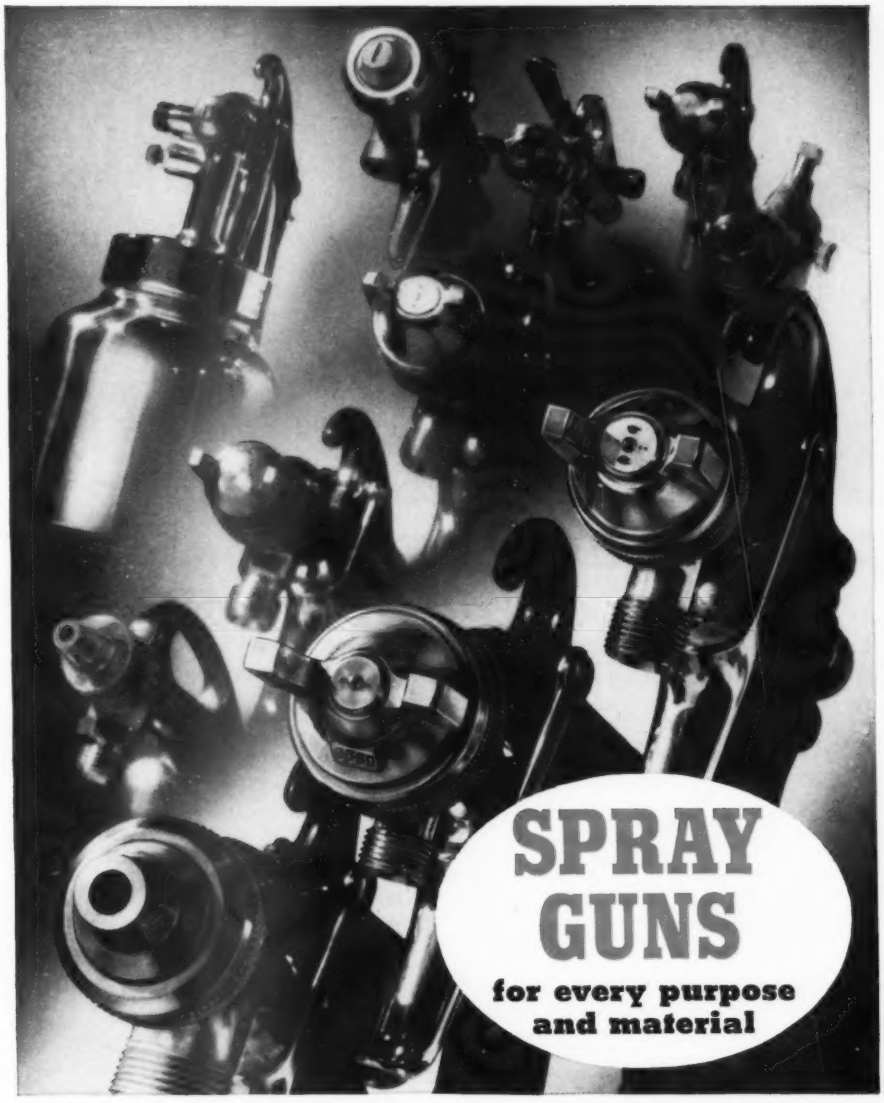
D-Enameling can very well mean the difference between profit and loss. It will pay you to investigate the possibilities that D-Enameling offers you. In fact, we'll prove its benefits at our expense! All you need do is write, wire or phone us so that we can make arrangements to D-Enamel three or four parts NO CHARGE. When you see the results and learn how inexpensive D-Enameling really is . . . how it may help your profit picture, you'll be sold. Just get in touch with us. Do it today . . . now!

*D-ENAMELING IS A PATENTED PROCESS.

D-ENAMELING SAVES DOLLARS...
D-ENAMELING SAVES STEEL

Since October 1949, D-Enameling has saved over 20,000 tons of fabricated steel parts.

New Process *D-Enameling* Corp.
Highland and New Haven Avenues • Aurora, Illinois



Today, thanks to recent developments in Binks spray guns—you can use spray guns for more jobs than ever before.

For example, the Binks line—in addition to precision guns for applying vitreous enamel manually—includes equipment for *automatic* finishing of washing machine tubs, clay pipe, pottery, tile, range parts, etc. Furthermore, all these guns will handle *either* high or low pressure with just a simple nozzle change.

And this is only a beginning. With 36 gun models and 1050 nozzle combinations currently available, Binks equipment is applying materials ranging from those fluid as water to those thick as tar. So, whatever the finish or coating, Binks can tell you if spraying is possible...and what equipment to use. Send in coupon or write: Binks Manufacturing Co., 3122-40 Carroll Ave., Chicago 12, Ill.

For FREE booklet of painting hints, MAIL COUPON!

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES

•

SEE YOUR CLASSIFIED PHONE DIRECTORY

Binks
EVERYTHING FOR CERAMIC FINISHING

Binks Manufacturing Co., 3122-40 Carroll Ave., Chicago 12, Ill.

Gentlemen: Please rush my FREE copy of "SPRAY PAINTING HINTS," the pocket-size guide to overcoming common troubles in spray finishing. I understand there is no obligation.

NAME_____

ADDRESS_____

COMPANY_____

CITY_____ ZONE____ STATE_____

Ekco defense plant in Chicago — *recently held "open house" for members of the Chicago area press who viewed two highly mechanized semi-automatic production lines on which the housewares and bakery equipment firm is mass-producing steel artillery shell cases. Top-ranking Army and Navy ordnance officers authorized the first public showing in the Chicago area of what is being done about the much-publicized "ammunition shortage." Photo shows operations on the final inspection line.*

U. S. Senator Alexander Wiley, of Wisconsin, chairman of the Senate Foreign Relations Committee, opened the speaking program at the Monday luncheon with an appraisal of the nation's present foreign relations policies.

The general session which followed included talks by F. N. Mabee, retiring LPGA president, Denver; H. Ferris White, partner in Booz, Allen & Hamilton, Chicago; and Mort Farr, immediate past president of the National Appliance and Radio-TV Dealers Association, Upper Darby, Pa.

4,510,000,000 gal. market in 1952

Citing the estimated 4,510,000,000 gallons of LP-Gas marketed last year as an indication of the stature now enjoyed by the industry in the nation's economy, Mabee viewed the future with optimism. He said a recent survey by the LP-Gas Information Service indicated that 23% of the homes in LP-Gas areas still cook with coal, wood, kerosene or gasoline, 38% of the homes with central heating plants and 23% of those with space heaters still burn wood or coal.

Stating that "Failure to grow in industry is to start on the road to economic death," Farr asserted that expansion should not be achieved at the expense of any other element in the industry.

"It is in the recognition of your responsibility to the others in the field that cooperation enters," he said. "With real cooperation, troubles would be fewer and profits would be greater."

Promotion features LP-Gas heating

In a progress report on the National LP-Gas Promotional Program, the Monday business session, Lee A. Brand, of Empire Stove Co., Belleville, Ill., and chairman of the National Committee for LP-Gas Promotion, said a ninth round of national advertising is now appearing in 50 magazines with a combined readership of 103,000,000. He announced that the tenth round, to be released this summer, will feature LP-Gas heating.

The 1954 conclave has been scheduled for May 9-12 in Chicago. It will also be held in the Conrad Hilton Hotel.

A. O. SMITH UPS CORNELL

The appointment of F. S. Cornell as executive assistant to the president of A. O. Smith Corporation, Milwaukee, was announced by L. B. Smith, president. Cornell will continue his responsibility as manager of the Permaglas-Heating Division, Kankakee, Ill.

It was announced that a four-man committee of department heads will administer the Kankakee operation under Cornell's direction. The committee consists of R. S. Friend, works manager, W. W. Higgins, chief engineer, S. E. Wolkenheim, general sales manager, and D. J. O'Connel, business administration.

PLUMBING & HEATING INDUSTRIES BUREAU HAS $120,000 BUDGET

To enable the Plumbing and Heating Industries Bureau to step up its volume of favorable publicity, a budget of $120,000 will be proposed for 1954, George O. Toepfer, Bureau treasurer, told the members of the Central Supply Association at their spring meeting in Chicago.

UDYLITE CORPORATION NAMES THREE TO TOP POSTS

Udylite Corporation has announced that L. K. Lindahl is chairman of

L. K. LINDAHL

the board, and that Clyde H. Reeme is the new president.

In other Udylite shifts, Lindahl announced the appointment of Lawrence V. Nagle, formerly vice president and general sales manager, as executive

INCREASE YOUR PROJECTILE OUTPUT *with* MACCO 472

For All Machining Operations

HIGHER PRODUCTION—LOWER COST

Whether your problem involves increasing the production of hard-to-work projectiles or other equally difficult operations, Macco 472 will enable you to handle the toughest job better, faster and more economically.

This highly versatile, water soluble cutting oil lasts longer, eliminates odors, reduces down-time and cuts costs. Actual tests prove that Macco 472 gives you faster cutting speed and, in many cases, increases tool life up to 300% and more.

For a convincing guaranteed test in your plant, write, wire or call. Phone AB 4-3200, Chicago.

Materials gladly furnished at no expense to you if not entirely satisfied.

RUST-PROOFING

For shell cavity rust-proofing, investigate Macco Bluecoat or Macco Anti-Rust.

MACCO PRODUCTS COMPANY

CHEMICAL COMPOUNDS

472

THE BEST CUTTING SOLUTION IN THE LONG RUN

FOR THE METAL WORKING TRADE--SINCE 1931

525 W. 76th STREET ★ CHICAGO 20, ILL.

vice president and Arthur L. Barak as treasurer.

Subsidiary companies wholly-owned by Udylite are the Frederic B. Stevens Company, Detroit; Mitchell Manufacturing Division, Indianapolis, Buffalo and New Haven; Frederic B. Stevens of Canada, Limited; L. H. Butcher and Company, Los Angeles; and Parker-Wolverine Division, Detroit.

STOVE MEN TO MEET IN CINCINNATI, JUNE 1-3

The 21st annual convention and exhibit of the Institute of Cooking and Heating Appliance Manufacturers will be held at the Netherland Plaza, Cincinnati, June 1-3. Theme of the convention is "*Everybody Works for the Sales Department.*"

General Session Speakers

General session speakers include: Cecil M. Dunn, president, RCA-Estate Appliance Corp., and ICHAM president, discussing "*Long Range Objectives for the Appliance Industry*"; Robert A. Whitney, president, National Sales Executives, Inc., on "*Taking a Second Look to Increase Sales*"; and Martin R. Gainsbrugh, National Industrial Conference Board, on "*What Economic Forecasts Mean to Sales.*"

COBALT ORDER AMENDED

Removal of a prohibition on certain uses of cobalt salts and compounds made from residues not suitable for metallurgical applications was announced by the National Production Authority, Department of Commerce.

An amendment of Schedule 2 of Order M-80 (alloy materials and alloy products), effective May 1, permits the use of such cobalt salts and compounds in coloring glazes, glass batches, porcelain enamels, ceramic body stains, porcelain enamel color oxides, glass batch colors, paint or plastic pigments. The amendment also permits the use of these and other forms in paint driers for use in exterior house paints only.

COAL GROUPS MEET TO EVALUATE HEATING EQUIPMENT

Eighty of the country's leading coal producers and retailers met recently in Columbus, O., to evaluate the status of coal-fired automatic residential heating equipment and to consider ways to increase coal markets through the sale of such equipment. Lennox Furnace Co. provided facilities for meeting sponsored jointly by Bituminous Coal Research, Inc., American Retail Coal Assn., and Products Promotion Committee of National Coal Assn. It was first joint undertaking of these groups.

E. R. Kaiser, asst. director of research, and J. R. Garvey, supervising engineer, both of BCR, displayed and discussed 20 pieces of equipment.

Right: Coal industry representatives are shown entering plant of Lennox Furnace Co., Columbus, O., to attend stoker conference sponsored by Bituminous Coal Research, Inc., in cooperation with two other coal industry groups.

Left: Coal men inspect a crop dryer developed by Bituminous Coal Research, Inc. T. O. Lawler, manager of crop dryer sales, BCR Products, Inc., is shown second from right.

ELECTROPLATERS MEETING IN PHILADELPHIA, JUNE 15-18

The 40th annual convention of the American Electroplaters' Society will be held on June 15, 16, 17 and 18. The Philadelphia Branch of AES has prepared a technical and social program that promises to set the standard of excellence for electroplaters' conventions of the future.

The technical sessions will cover a wide variety of subjects and are highlighted by a symposium on chromium plating. Papers to be presented have been carefully selected to cover all phases of plating including cost estimating, the control and effect of cyanide decomposition, recent developments in the plating field, test procedures, etc.

A special round table question period will be conducted on the evening of the 16th. All speakers will be present, but it is anticipated that the major portion of the discussion will be from the floor.

The Benjamin Franklin Hotel will serve as headquarters and is expected to house virtually the entire attending membership. Those desiring rooms are urged to contact the hotel directly, identifying themselves as attending the AES convention.

HOMMEL TITE-WITE . . .

Try this frit of many uses in your own plant

For uniformity of color and the finest porcelain enamel finish, use Tite-Wite. This titanium cover coat frit is chemically balanced, properly smelted and water shattered to give a very uniform grain structure.* In your plant this means to you:

* This unretouched photo shows the uniform particle size you will find in each bag of Tite-Wite Frit.

- Faster grinding
- Uniform specific gravity after milling
- Smoother spraying
- Wider firing range
- Maximum color stability
- Exceptional resistance to hairlining and tearing
- Better acid resistance
- Greater scratch resistance

These advantages are the reason why more enamelers are turning to this Superopaque White Enamel that can be drained, swilled or sprayed.

THE O. HOMMEL CO. PITTSBURGH 30, PA.

POTTERY • STEEL AND CAST IRON FRIT
CERAMIC COLORS • CHEMICALS • SUPPLIES

Our Technical Staff and Samples are available to you without obligation. Let us help with your problems.

"THE WORLD'S MOST COMPLETE CERAMIC SUPPLIER"

West Coast Warehouse, Laboratory and Office, 4747 E. 49th Street, Los Angeles, California

Conference on appliance control components

(Continued from Page 20)

tacts to control electrical components according to a pre-determined cycle of operation.

Wotring said that General Electric's 1953 models use the components currently in quite general use in the industry.

"Dishwasher production volume is low in relation to most other motorized appliances; therefore, the use of a standard washing machine motor represents a considerable saving in manufacture and in the cost of customer service.

"The use of a standard motor requires a separately-driven control and a drain pump which are now available to the dishwasher industry by component specialists," he stated.

Wotring described a pressure switch being used by a number of dishwasher manufacturers. "This switch employs a flexible diaphragm and a single-pole throw switch element. Both the tripping pressure and differential pressure are adjustable. With this switch, it is possible to either control water level or detect abnormal water levels. . . . With the control arrangement utilizing a time fill, a drain pump, and a control which can be rotated by the operator, it is possible to rotate the knob in such a way as to eliminate the pump-cut of the cycle and introduce two or even more charges of water into the machine."

A challenge to component suppliers and dishwasher designers

It must not be assumed that all the problems associated with dishwasher controls have been solved, said Wotring. "Much has been done in the past year to increase the reliability and operating life of these components. More remains to be done especially with lubrication which will last 20 years. 'Time fill' is probably not the best answer to water measuring even if it is the simplest at present. Many areas of the country have their water mains so overloaded that pressures drop to 10 or even 5 pounds at times, which can only result in poor washing due to insufficient water.

"The series relay long used successfully will not work on a low cost motor with insufficient slope to the load-current curve. Floats and pressure devices require the driving motor to be stopped while filling. This further increases total operating time which is already too long. Noise must be reduced, especially from the water flow regulating device which telegraphs through the house piping."

In conclusion, Worting states "It certainly behooves all of us to use these years of low production *(of dishwashers)* to construct a strong foundation of product excellence and dependability on which can be built the 1,000,000 units-a-year industry predicted within about five years."

Fundamentals of bimetal performance

Modern thermostatic bimetals are sturdy and rugged materials, stated Alban, of W. M. Chace Co.

The bimetals can be formed, cut, punched, embossed, rivited, spot welded, silver brazed, or soldered. They have high elastic limits imparted by cold rolling, and can do mechanical work proportional to the square of the temperature change. The temperature change can be produced by radiation, convection, conduction, etc.

Alban warned against misapplica-

Appliance Engineers' Day at Appliance Park

A feature of the three-day meeting was a tour of General Electric Company's Appliance Park, located near Louisville.

From their seats in a special train used throughout the tour, the appliance engineers viewed some of the production operations in Buildings 1 and 2 (see Page ST-14 in Safe Transit section), and watched the installation of equipment in Building 3. In addition, they also got a glimpse of the foundations for Buildings 4 and 5.

Some facts about Appliance Park

Throughout the tour, G-E officials used a public address system to acquaint the engineers with some pertinent facts about Appliance Park. Ultimately it will have:

4,000,000 square feet of factory area
400 out of 942 acres in active use
21 miles of railroad
8 miles of roads
40 miles of conveyors
80,000 kva power supply system
300 railroad cars and 200 trucks in-and-out per day
boiler house with capacity of 900,000 lbs. of steam per hour

Appliance manufacturing facilities

The appliance manufacturing facilities, when complete, will consist of five large buildings all similar in structure, and so designed that, if necessary, the buildings could be expanded and joined to form a single building three-fourths of a mile wide and 1500 feet long.

Building 1 is currently producing home laundry equipment, and Building 2 is producing ranges and water heaters. Building 3, to be completed soon, will house the electric sink and cabinet department. Refrigerator units will be produced in Building 4, while cabinet production and final refrigerator assembly will be centered in Building 5.

Now... a foolproof, low-cost timer for washing machines and dryers!

Available with 1 to 4 single-throw switches
Range: 30 - 60 - 120 and 180 minutes

Approved by Underwriters' Laboratories
for 25 amps, 230 volts, ½ h.p. - A.C.

For the full story on this foolproof, low-cost timer get in touch with LUX today!

Look for the "MINUTE MINDER MAN" tag — it dramatizes the famous Lux Timer line found on America's finest appliances

LUX Time

YOUR TIME-REMINDER LINE

THE LUX CLOCK MANUFACTURING COMPANY • WATERBURY 20, CONNECTICUT

tion of bimetal. "In the past," he pointed out, "we have had applications where thermostatic bimetal was misapplied. Stresses and temperatures have been too high. Corrosion and erosion have been problems. Poorly constructed devices with inferior materials have caused trouble."

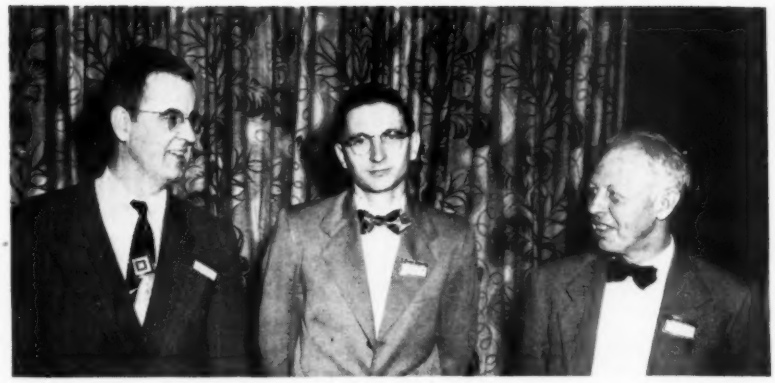
All components should receive careful attention from the appliance designer

The bimetal element is often wrongly blamed for troubles, he stated. "The fact that a loose, weak mounting was used is sometimes overlooked. The main point is that all components should receive careful attention from the designer. Careful selection of all materials and their assembly is paramount."

When bimetal thermostats change calibration with temperature and time, there is always a reason, he stated. Sometimes careful analysis of each component is required to locate the source of trouble.

For example, Alban pointed out, consider a well-constructed thermostat of the finest materials available. Occasional changes in calibration occur in shipping during the winter. Examination shows that the bimetal is under mechanical restraint to obtain the required operating temperature. In this case, additional stress is built up in the bimetal due to being transported through a cold area. The additional stress built up is sufficient to exceed the elastic limit of the bimetal, and a change occurs.

This could be baffling, said Alban, as the thermostat was OK when it left the factory. Laboratory tests at the destination show the calibration is off for no apparent reason. This problem can be solved by either re-



Among these attending the Appliance Technical Conference in Louisville were: K. B. Smith, of Globe American Corp.; A. R. Kays, of American Kitchens Division of Avco; and R. S. Goldthwaite, of Rutenber Electric.

designing the thermostat or using a lower deflection rate bimetal. Usually the best method is to design a thermostat where the bimetal is free to deflect until the control temperature is reached. Another method is to limit the stresses within the elastic limit of the bimetal, concluded Alban.

Reversed thermostat metals

Sears, of General Plate Division, Metals & Controls Corp., discussed the application of reversed thermostat metals in three categories: compensation, straight-line motion, and positive make-and-break.

In the compensation category, he referred to the use of reversed thermostat metals in gas appliances to speed the closing time of safety pilots, and in electric flatirons to eliminate or minimize the initial temperature overshoot—a problem resulting from the trend to higher and higher wattage heating elements.

In the straight-line motion category, Sears referred to the use of reversed thermostat metals in flame detector or stack controls—especially where the operation of the control is by response of a thermostat metal element to the temperature of the products of combustion. "Furnaces vary in efficiency so that the element must be able to go through its cycle of operation for a relatively small temperature change in an efficient furnace, while in others not so efficient it must be able to contend with the large excess movement produced by the large temperature changes."

The third category mentioned by Sears was positive make-and-break. "In a thermostat whose element is a simple cantilever strip operating a movable contact and carrying the control current, the making and breaking of the contacts is slow. A plain cantilever element is essentially a creep-type element in that it moves relatively slow—its movement being determined by the rate of change of its ambient. There is always a possibility that a normal amount of slight vibration which may be present in the environment will cause arcing of the contacts while they are making or breaking. This causes deterioration of the contact points and also radio interference. A reversed thermostat metal element overcomes this defect, and insures quick positive make and break of the contacts."

Kitchen layout studies

McNamee discussed "Kitchen Layout Studies", basing his talk on results of a contest conducted early last year by McCall's Magazine. (For a report on the results of the contest, see *"What 20,000 Women Want in Their Kitchens"*, by Mr. McNamee, July, 1952, *finish.*)

Certain wants of the homemaker stand out clearly, stated McNamee. The average contestant would like a larger kitchen, more windows, an eating area in the kitchen, and a first-floor laundry, and she is beginning to regard an electric sink, a freezer, an automatic washer and dryer as necessities, just as much a part of her home as her refrigerator.

MAUER TO KNAPP-MONARCH

Mel E. Mauer, formerly with Nesco, Inc., has been elected vice president in charge of manufacturing, Knapp-Monarch Co., St. Louis.

ADMIRAL STEPS UP RANGE PRODUCTION

Efforts are being made to step up substantially the production of Admiral ranges at the company's Galesburg, Ill., plant, William P. Mackle, range sales manager, reports. This year's output is expected to be substantially ahead of 1952.

He added that Admiral is shipping more than 25 per cent of its electric ranges with an automatic basting roaster.

NEW SERVEL JUMBO FREEZER

An upright home freezer with nearly 22 cubic feet of storage space has been developed by Servel, Inc. as the top-of-the-line companion to its 11- and 15-cubic-foot vertical freezers which were introduced earlier this year. Shipments of the new model started in mid-May.

Gordon Malone, sales manager of Servel's home freezer division, said that the new model offers 20 cubic feet of frozen food capacity and will hold 700 pounds of food in its freezing area. In addition, nearly two cubic feet of dry storage space has been provided in a tilt-out bin at the bottom of the cabinet. Servel also is marketing chest-type home freezers of 9, 15 and 22-cubic-foot capacities.

ARMCO OFFICERS ELECTED

Charles R. Hook was elected chairman of the board of Armco Steel Corp. at the organizational meeting of the Armco board of directors. W. W. Sebald was elected president and chief executive officer.

The following officers were also elected: R. S. Gruver, vice president; H. H. Tullis, vice president; F. H. Fanning, vice president - operations; L. T. Johnson, vice president - sales; C. H. Murray, vice president - personal and public relations; L. F. Reinartz, vice president - operating developments; E. A. Correa, secretary; F. D. Danford, treasurer; and D. E. Reichelderfer, controller.

R. L. Gray, president of Sheffield Steel Corporation, a wholly-owned subsidiary, was again elected vice president of Armco.

HEADS HERCULES POWDER

Albert E. Forster was elected president of Hercules Powder Company at a recent meeting of the board of directors. He was elected also chairman of the executive committee.

BLAKESLEE SALES ENGINEERS

G. S. Blakeslee & Co., manufacturer of degreasing machines and pump-type alkali washers, has added Henry Kashman as sales engineer for the Company's New York City and Long Island territory and Wilbur Thiess for the southern half of Ohio and portions of Kentucky and West Virginia.

FEINBERG TO USAIRCO BOARD

David E. Feinberg, vice president, has been elected a director of the United States Air Conditioning Corp., Minneapolis, it was announced by Wesley J. Peoples, president.

RIEGER SUCCEEDS LINDER AT G-E APPLIANCE PARK

Clarence H. Linder, vice president and general manager of General

CHARLES K. RIEGER

Electric Co.'s major appliance division, located at Appliance Park, Louisville, has been named vice president of engineering for G-E with offices in New York City, it was announced by Ralph J. Cordiner, president. He will be succeeded at Appliance Park by Charles K. Rieger, vice president and general manager of G-E's small appliance division, located in Bridgeport, Conn.

U.S.S. 1ST QUARTER INCOME UP

United States Steel Corp. income for the first quarter of 1953 is reported as $49,375,958, or a return of 5.3 per cent on sales. This compares with income reported for the first quarter of 1952 of $43,534,212, or a return of 5.0 per cent on sales.

PANGBORN PLANT EXPANSION

Pangborn Corporation, Hagerstown, Md., has announced the completion of a new addition to its production facilities. One five-ton and one ten-ton crane have been installed in the building to facilitate materials handling in the production area. The importance of materials handling is indicated by the expenditure of $50,000 for truck loading docks out of the total $300,000 cost of building.

MART TO GIVE BUS SERVICE DURING CHICAGO MARKET

For the fourth consecutive market, The Merchandise Mart will provide free bus service for buyers attending the International Home Furnishings Market in the Mart. The buyer bus service will operate during the first five days of the June market, from June 22 through June 26.

Banner-bedecked busses marked "Merchandise Mart Buyers' Courtesy Bus" will run from the Loop hotels to the Mart. Hotels served include the following: Congress, Conrad Hilton, Blackstone, Palmer House, Morrison, Chicagoan and the Sherman.

THOR APPLIANCE SALES UP 40%

First quarter sales of major household appliances produced by Thor Corporation of Chicago totals $9,651,391, an increase of 40 per cent over sales for the first quarter of 1952, Raymond J. Hurley, chairman, announced.

Thor recently added upright home freezers, refrigerators, and electric wall ranges to its appliance line, which includes washers, ironers, dryers, and chest-type freezers.

HOUK TO WESTINGHOUSE CONSUMER PRODUCTS POST

The appointment of L. S. Houk as manager of manufacturing for consumer products of Westinghouse Electric Corp. has been announced by J. M. McKibbin, vice president.

Houk's post is a newly-created position. He will be responsible for manufacturing functions throughout the company's consumer products divisions, which include electric appliances, television and radio, lamps, and electronic tubes.

STEWART TO DIRECT AMANA ELECTRONIC PAINT FACILITIES

Neal Stewart, a veteran of 20 years of production experience, has been

named paint superintendent of Amana Refrigeration, Inc., Amana, Iowa. His first responsibility is the design, installation and supervision of Amana's new electronic paint installation, which in itself is expected to make possible a 30 per cent increase in the plant's freezer output.

Before joining Amana, Stewart served as staff assistant to the plant manager, Weatherhead Co., Cleveland; production superintendent, Deepfreeze Appliance Division of Motor Products Corp., North Chicago; and general production foreman, Houdaille-Hershey Corp., Decatur, Ill.

FOLLANSBEE STEEL APPT.

William M. Bausch, formerly sales manager for mill products, has been named assistant vice president in charge of mill sales for Follansbee Steel Corporation. He will be in charge of sales for products coming out of the company's manufacturing facilities at Follansbee, W. Va. These include cold rolled sheets and strips, polished blue sheets and coils, and seamless terne metal roofing.

Factors influencing adherence of paint films

(Continued from Page 30)

these paints will give a tough, adherent, and protective film while the other will be a failure. These tricks of art that make for a good versus a bad paint formulation are the province of the paint formulator and not that of the paint user. However, the existence of these features puts certain burdens on the paint user to maintain specification conditions in film application.

Too long or too little time left for flashing the solvent before the baking oven can affect the results. Changing the conditions of the baking schedule with respect to time and temperature can also affect the quantity and solvency of thinner retained in the film. Changing baking conditions alters the curing reaction in other ways which can hurt or benefit adherence; however, these other effects are influenced more by changes in the latter fraction of the baking cycle. The particular factors that are influenced most by solvent retention are influential usually in the initial part of the baking schedule. Most enamels are formulated to have a wide tolerance to variations in baking conditions; however, where paint formulations are designed to give the most exacting specifications in film properties, it is sometimes necessary to pay for these added benefits by exercising far greater control in both the manufacture of the paint and in its application. It is a sad fact that the more we strive to get the maximum superiority out of a particular type of paint formulation, then the more we need pay for it with expensive quality control. The differences are frequently more than marginal.

For example, where the conditions are ideal, a paint formulation may give a film that resists deterioration in alkali for 200 hours and which has an almost negligible rate of creep corrosion in salt spray. A poor solvent balance or poor control of baking conditions, or thinning with an improper solvent to spraying viscosity may give a film that lacks impact resistance, and which fails in less than 24 hours in alkali or salt spray. Such differences in protective properties are probably associated in greater part with good or poor adherence, since at least in some instances of alkyd-melamine enamels, the films themselves when both are stripped free of the metal do not seem to differ greatly in either physical or chemical properties. Similar differences can be produced by poor versus good surface preparation of the metal even where the same paint is applied in the same way — hence the capacity of a film to form an adherent bond with the metal is an important determinant of its protective as well as decorative properties.

Volatility effects — Even in paints so constituted with respect to solvents and resins that no film incompatibility effects are possible, the thinner can still affect the adherence for better or for worse. It has been demonstrated that turbulence and "whirlpool" disturbances take place when a large quantity of highly volatile solvent separates from the film. These effects cause phenomena such as orange-peel, or other check patterns made up of ridges and depressions in film thickness. These film thick-

ness variations affect the stresses in the paint film, which undoubtedly have some effect on adherence. It has been demonstrated, for example, in vinyl and other thermo-plastic films, that the adherence improves if the nearly solvent free film of non-uniform film thickness is fused so that it reflows, thereby adjusting itself better to the irregularities which anchor the film to the metal surface and also which relieves the film of conditions that allow for non-uniform stress conditions. Ordinarily, the protective and decorative properties of films improve after such a heat treatment though the physical and chemical properties of the film forming material are not changed greatly by the fusion process. Somewhat similar results can be obtained by using solvents of reduced volatility; however, other problems such as excessive air-drying times and solvent retention often make such a remedy inapplicable. While this condition cannot be cured entirely, it sometimes can be improved by using thinners of as low a volatility as is practical, since this minimizes the turbulence effects of rapid solvent evaporation.

Rapid vaporization of thinner has a pronounced cooling effect on the film. Under conditions of high humidity, moisture condensation can occur and the water can be entrapped in the film. If the adhering surface is hydrophillic, the water may migrate to contaminate the surface. It is difficult to predict how important this effect may be in commercial practice. It is probably less important for the curing type of enamel systems which produce water as a reaction by-product than it would be for some thermoplastic resins of the very hydrophobic type. Theoretical studies on adhesives require techniques that control humidity during the process of film formation, and probably industrial practice in the application of solvent type films will show a greater tendency for adherence failures to occur during periods of high humidity. However, there seems to be little or no systematic data to prove the point. However, the importance of this factor would merit some industrial scrutiny.

KING RESIGNS FROM MT. VERNON FURNACE; JOINS HOMMEL STAFF

Ernest Hommel, president of The O. Hommel Co., has announced the

appointment of Melvin D. King to handle sales and service on porcelain enamel in the Michigan territory. King recently resigned as enamel su-

perintendent at Mt. Vernon Furnace and Mfg. Co., Mt. Vernon, Ill.

BENDIX NAMES FOOSHEE CLYDE PLANT MANAGER

Virgil C. Rice, director of manufacturing, Bendix Home Appliances

Division, Avco Mfg. Corp., has announced the appointment of William N. Fooshee as plant manager of the firm's Clyde, Ohio, factory. He succeeds B. E. Brennan, former resident manager, who resigned. Fooshee joined Bendix in 1944, and has been manager of costs and methods at the Clyde plant.

NEW WEST COAST PLANT FOR FEDERAL ELECTRIC PRODUCTS

Federal Electric Products Company, of Newark, N. J., manufacturers of safety switches, switchboards, circuit breakers, and related equipment for industrial, commercial, and domestic use, is now completing a new plant in Los Angeles, with production scheduled to start within the month, according to T. M. Cole, president.

Y.S. & T. 1ST QUARTER SALES UP, INCOME DOWN

Report for the first quarter of 1953 of The Youngstown Sheet and Tube Company shows net income of $6,958,975 or $2.08 per share compared with $7,038,787 or $2.10 per share for the first quarter of 1952. Shipments of steel products in the first quarter were the largest for any similar period in the company's history. Net sales and other revenues during the quarter amounted to $140,564,614 compared with $125,021,321 in like period of 1952.

HOTPOINT STAGES BIGGEST CONSUMER PROMOTION

Targeted to move some $80,000,000 of appliances to consumer homes during the summer months, the biggest 60-day consumer promotion in Hotpoint Co. history will get under way June 1. Top consumer magazines, radio and television shows will be used to push the nation-wide selling activity.

The retail selling campaign is designed to dramatize the company's new 1953 line of kitchen and home laundry appliances, John F. McDaniel, vice president, marketing, said. Dealers are being supplied with new display backgrounds, individual displays, demonstrations and consumer mailing pieces. Hotpoint is going all out with its national adver-

tising program to back up the promotion for retailers.

Packages of point-of-sale materials, demonstration suggestions and a digest magazine will be introduced during this 60-day program.

During this promotion, the Hotpoint sales training department will implement the second phase of its 1953 program for helping retailers to build sales.

SYLVANIA NAMES EXECUTIVES

The election of Don G. Mitchell as chairman of the board of directors and H. Ward Zimmer as president of Sylvania Electric Products Inc. were announced by the board of directors. Both officers assumed their new duties May 1. Their headquarters are in New York City.

Mitchell, president of Sylvania since 1946, is a director of the American Management Association and chairman of its executive committee. He also has been a director of the National Association of Manufacturers, National Electrical Manufacturers Association, and National Sales Executives, and at present is a trustee of the Committee for Economic Development.

REFRIGERATION, AIR CONDITIONING CONFERENCE IN SEATTLE

One of the three displays judged most educational at the conference.

Enthusiastic support by the refrigerator and air conditioning industry of the Pacific Northwest made a marked success of the 11th Refrigeration and Air Conditioning Educational Exhibit and Conference held at Seattle, Washington, on April 24-26, according to the Refrigeration Equipment Manufacturers Assn.

Fifty-two companies furnished educational exhibits while interest in the technical talks ran much higher than usual with standing room only at most sessions.

Displays judged the most educational by service engineers and contractors in a contest sponsored by the Refrigeration Equipment Whole-

VERSATILE KITCHEN APPLIANCE WINS HESS AWARD

This combination sink-range-refrigerator, timer, drainboard and storage drawer, produced by General Air Conditioning Corp., Los Angeles, won the 1953 Hess Brothers Award for versatility in design. The appliance contains fiber glass insulation separating freezer and refrigerator from the range section.

salers Association were Detroit Controls Corp., Mueller Brass Co., and Penn Controls, Inc., in the order named.

MIDWEST ENAMELERS CLUB ELECTS NEW OFFICERS

New officers of the Midwest Enamelers Club include: W. K. Burriss, Ceramic Industry, president; C. M. Swan, U. S. Steel Co., vice president; M. B. Gibbs, Inland Steel Co., secretary-treasurer; and Jack Ohlhauser, Dwyer Products Corp., asst. sec-treas. The new officers will begin their two-year terms on September 1.

Three members, elected to serve three-year terms on the Club's Executive Council, are: A. J. Holloway, Lawndale Enameling Co.; Roger Fellows, Century Vitreous Enamel Co.; and A. L. Friedberg, University of Illinois.

WHEELER TO SALES POST WITH INDIANA STEEL PRODUCTS

Indiana Steel Products Co., producers of permanent magnets, has announced the appointment of P. M. Wheeler as regional sales manager, with offices in Chicago. He had been a sales engineer with the Valparaiso, Indiana, firm since 1951.

CLEVELAND FIRM WINS WESTINGHOUSE CONTRACTS

Contracts for complete porcelain enameling departments for two big new plants of the Westinghouse Electric Corp. have been awarded to the Ferro Corporation, Cleveland, E. W. Dany, vice president and chief engineer of Ferro, announced. Total value of the contracts approximates $1,600,000. Both plants will be completed late this year.

At Columbus, O., the Westinghouse appliance division is building a $20,000,000 structure for the manufacture of electric refrigerators. It will be the largest single plant yet built by Westinghouse, according to John H. Asbaugh, vice president in charge of the division.

At Vicksburg, Miss., the Westinghouse lighting division is erecting the nation's largest plant to be devoted exclusively to the manufacture of the commercial and industrial fluorescent lighting fixtures and industrial incandescent fixtures. Burt S. Burke is manager of this division.

MORGENSTERN TO DIRECT WHIRLPOOL DEVELOPMENT WORK

C. E. Morgenstern, chief engineer, has been appointed director of new product development for Whirlpool Corp., it was announced by John A. Hurley, vice president.

FLOYD WILLIAMS JOINS PEMCO

Floyd J. Williams has joined the engineering service department of Pemco Corporation, Baltimore. Williams joined Pemco after a year with Foote Mineral Company as sales engineer. He is a recent graduate of Ohio State University with a master's degree in ceramic engineering.

CHICAGO MILL can help YOU deliver safely

Wirebound,
Nailed or Hinge Corner
Cleated Plywood
Cleated Craveneer
Cleated Corrugated
Watkins Type Containers
Shop and Tote Boxes
Woodsteel Nesting Boxes

★

FOR DOMESTIC OR EXPORT
FOR PEACE OR DEFENSE

A shipping container for every shipping purpose

Admiral and many other leading appliance manufacturers depend upon Chicago Mill and Lumber Company to provide safe shipment for their finished products.

If you are having difficulty in solving a troublesome shipping problem, call in a Chicago Mill representative. Technical information, packing information, and testing services are available without obligation.

FOR SAFER TRANSIT BY • TRUCK • BOAT • TRAIN • PLANE

CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street — Chicago 3, Illinois

Plants at: Helena, Arkansas • Greenville, Mississippi • Rockmart, Georgia
Tallulah, Louisiana • South Fork, Colorado • Chicago, Illinois


sale transit

CUSTOM DESIGNED

HEAVY-DUTY SHIPPING CONTAINERS

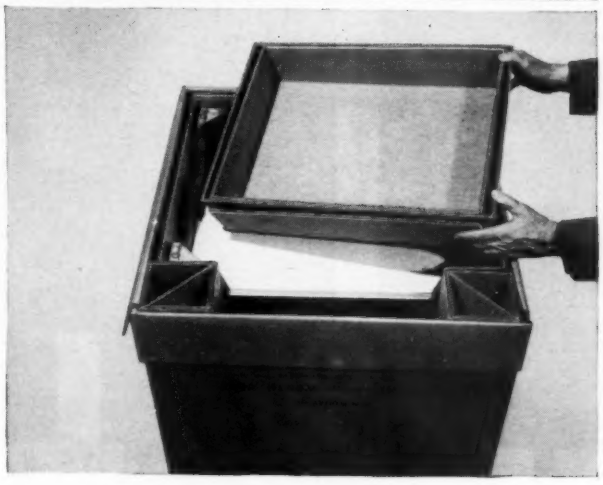
Capehart-Farnsworth "floats" T.V. sets

Capehart-Farnsworth Corporation was using an officially-approved container for its television sets. The container was made of corrugated fibreboard, but the sets were bolted to wooden skids. This construction was so rigid that the legs were apt to break if the set was dropped, and there was considerable freight damage to the most expensive sets.

Capehart and International's Container Division engineers joined in seeking an improved container. Together they developed the principle of SKIDLESS CONSTRUCTION.

To make this construction possible, Capehart added a wood retaining rail around the inside of the cabinet, just above the legs. A buffer was formed of corrugated fibreboard, fitting snugly against this ledge. Thus the television set was "floated" inside the container, its legs relieved of all stress.

We would like to give you more information about this and other package designs. Write to any of the manufacturing plants listed below—



International Paper company

CONTAINER DIVISION

220 East 42nd Street, New York 17, N. Y.

Los Angeles 54, Cal. 5120 South Soto St.
Kansas City 3, Kan. 2102 Kansas Ave.
Springhill, Louisiana
Somerville 45, Mass. Clyde & Warwick Sts.
St. Louis 11, Mo. 7901 Michigan Ave.
Chicago 38, Ill. 5133 West 65th St.
New York 17, N. Y. 220 East 42nd St.
Wooster, Ohio 689 Palmer St.
Whippany, New Jersey
Georgetown, So. Carolina

ST-2

safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and metal products manufacturing field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

CONTENTS

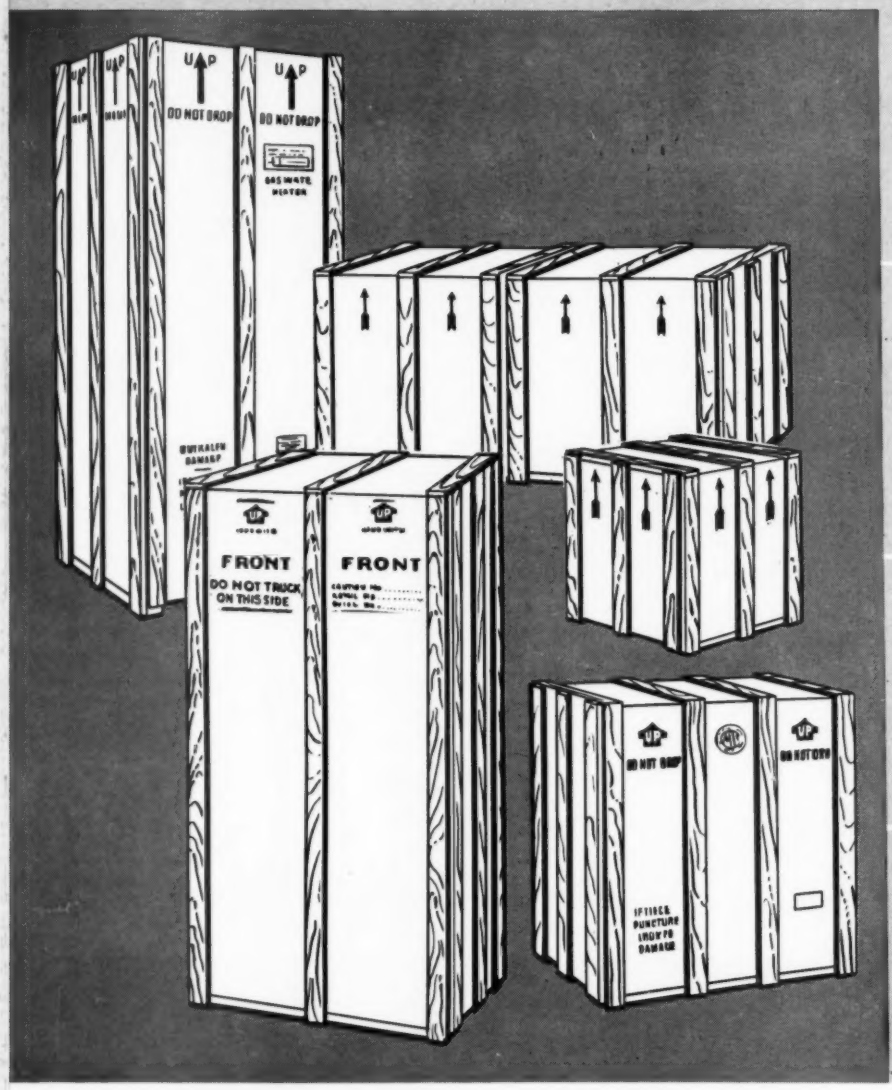
National Packaging Exposition *— held at the Navy Pier in Chicago, April 20-23, drew an estimated 27,500 visitors who viewed the products of 350 exhibitors. From individually wrapped cigarettes to complete packaging production lines, newest developments in the more than $7 billion-a-year packaging industry were displayed at the 1953 show which broke previous attendance and exhibitor records.*

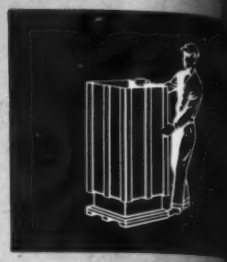
finishfotos

Above: At exhibit of Clark Equipment, operators of industrial trucks demonstrated how to handle two crated water heaters or eight packaged television sets at one time. Below: Sherman Paper Products displayed their new self-sealing protective wrapping for metal parts.

Ship safely in WATKINS cleated corrugated containers

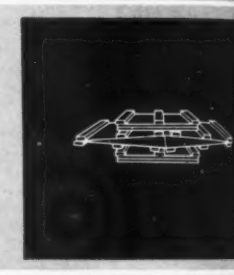
WATKINS GIVES GREATER STACKING STRENGTH



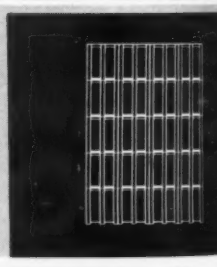


ASSEMBLY is speeded up with this easy-to-handle container. The assembly crews are all for packing the Watkins Way.

HANDLING shocks in the factory, in transit, and during delivery are resisted by the wood cleats, glued tube mat construction.



STORING problems are reduced to a minimum because of the 3-section design which provides for flat, close nesting.



STACKING is easy and safe, due to the supporting strength (minimum 4 tons on most containers) that is *engineered* into the Watkins design.

SAFETY, CLEANLINESS, LOW COST

For home appliances, for *all* types of finished products, the Watkins Container is your best insurance for safe delivery. Safety is ENGINEERED into every Watkins Container.

Cleanliness is another important point for manufacturer and for distributor, dealer and final customer. Watkins protects the fine finishes of your products and keeps out dust and dirt.

When you consider, too, that Watkins Containers are delivered 75% assembled and are designed to save you labor, time and money, the sum of all of these advantages should lead you to a Watkins manufacturer now.

The WATKINS CONTAINER · Manufacturers

. . . use the "Traveling Billboard" feature for product advertising . . .

these companies bui WATKINS CONTAINE

Cornell Paperboard Products Co. . . . . 1514 E. Thomas Ave., Milwaukee
Cozier Container Corp. . . . . . 446 East 131st Street, Cleveland
Crate-Rite Mfg. Corp., Division of Pacific Ports Ind. Inc. . . . . . 10901 Russett Street, Oakland, Ca
Dura-Crates, Inc. . . . . . 940 East Michigan Street, Indianapolis, I
General Box Co. . . . . . 1825 Miner St., Des Plaines, Illinois; 16th and Maple Sts., Louisville, Ky
Hemb & Martin Mfg. Co. . . . . . Watseka, I
Illinois Box & Crate Co. . . . . . 811 Center Street, Plainfield, I
Kieckhefer Box & Lumber Co. . . . . 1715 West Canal Street, Milwaukee
Lane Container Corp. . . . . . 10212 Denton Road, Dallas
Lewisburg Container Co. . . . . . 243 Singer Street, Lewisburg
Livingston Wood Manufacturing, Ltd. . . . . . Tillsonburg, Ontario, C
Love Mfg., Inc. . . . . . 608 South Commerce Street, Wichita, K
Utility Crate Corporation . . . . 1985 E. 16th Street, Los Angeles 21, Cal

—an inquiry to any of these companies will get prompt attenti

Record attendance at packaging show

visitors from the 48 states and 30 foreign countries visit National Packaging Exposition and concurrent Packaging Conference, held at the Navy Pier, in Chicago

THE largest packaging show in history, held at the Navy Pier in Chicago, April 20-23, drew an estimated 27,500 persons who viewed the products of 350 exhibitors, according to the American Management Association, sponsors of the 22nd National Packaging Exposition.

Last year's show in Atlantic City, the largest held up to that time, drew nearly 22,000 visitors to view the displays of 326 exhibitors. The last Chicago show, held in 1950, attracted 19,000 visitors.

Every state and some 30 foreign countries, among them India, Germany, Brazil, and the Philippine Islands, were represented among the show visitors. Canada sent the largest delegation—more than 300. Machines from Italy, France, and Switzerland were on display along with American equipment and packages.

Packaging conference

Nine hundred packaging executives attended the three-day AMA Packaging Conference, held concurrently with the show. Thirty speakers and session chairmen discussed trends and problems in both the selling and production areas of the more-than-$7-billion-a-year packaging industry.

The competitive emphasis now growing throughout American industry was evident in both the concurrent conference discussions and the exposition itself. Reflecting the shift in packages' function from mere containers to salesmen of their products, package designs and materials stressed eye appeal and product information. Shipping containers were spruced up to sell as well as protect. On the production side of packaging, mechanization was the keynote, with a variety of automatic and semi-automatic machines pointing the way to faster packaging of more items at less cost.

Above: Part of the crowd waiting to register on the opening day of the National Packaging Exposition. The 1953 show had an estimated attendance of 27,500 persons.

Packaging engineer's duties encompass wide field

Packaging is only part of a cycle that is tied into production, inspection, plant movement, storage, loading, and shipping, and the packing engineer's duties should be broad enough to encompass all these operations from the standpoint of product protection, R. Frank Weber, general supervisor, materials handling research, manufacturing research department, International Harvester Company, Chicago, told executives attending the American Management Association's national packaging conference at Navy Pier.

The packaging engineer, he advised, should be considered on a staff level, and his experience should be on a par with that of other top engineers in the organization. He should select his staff from the best men

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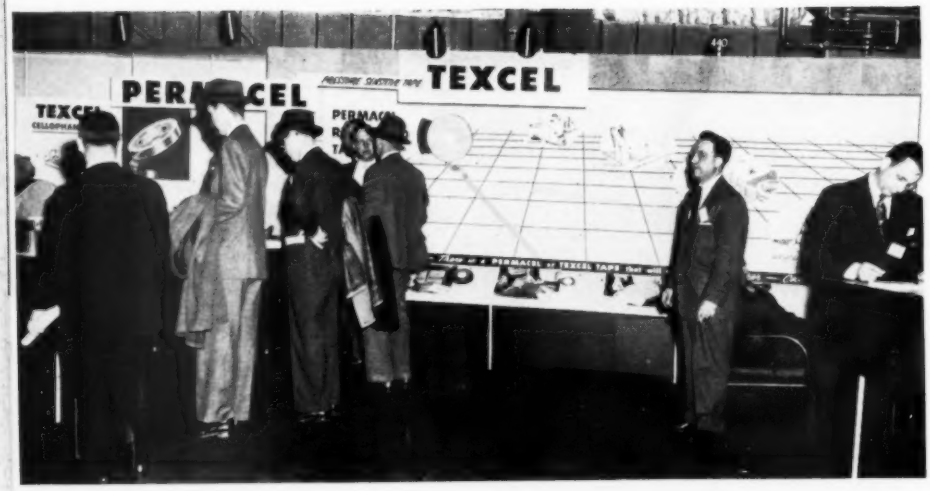

available and train them in all phases of packing.

A packaging program should begin at top management level

A good packaging program, Weber declared, should start at the top management level. A detailed plan of procedure should be worked out. "If the original survey plan . . . is sufficiently broad to cover all characteristics of a progressive packing program, the actual application in a plant operation will be comparatively simple."

Study also should be made of all handling methods related to the packing operations, he recommended. "Material flow in a packing operation sometimes means the success or failure of the system." Much can be done to improve layouts for straight line operation; it is not uncommon to find that distance of travel of material to and from operations can be reduced by from one-half to one third.

Packing cost control system

The program also should include an adequate packing cost control system, with a staff man assigned to keep the control plan effective. If controls are to be maintained, the packing and handling supervisory force must be interested and enthusiastic. Each supervisor should be informed at least monthly, according to Weber, of his cost accomplishments in maintaining his cost objectives.

At International Harvester, he reported, planning for over-all packaging programs is centralized in the materials handling research section. New packing and materials handling methods and facilities are developed in the materials handling research laboratory and made available to all plant operations as soon as they have passed laboratory and field tests and requirements. (See "*How International Harvester Answers Materials Handling and Product Protection Problems*," by Mr. Weber, July, 1949 *finish.)*

Trends in export packing

Trends in Harvester's export packing, listed by Weber, include im-

provements in storage and warehousing methods to give added protection and conserve large areas formerly wasted through antiquated practices; export packing by contractors at ports, often including cargo containers to help prevent damage to fragile goods and stop pilferage of small articles; improved knowledge of handling and storage conditions in foreign countries; special training for packaging engineers; and coordination of the efforts of shippers, railroads, ocean carriers, marine underwriters, and others interested in adequate export packing.

Packing research efforts have paid off, Weber declared, by giving additional safeguards to the quality of products and by showing a cost reduction potential averaging well over a quarter of a million dollars annually for the past five years.

Loss and damage in shipping a serious economic loss

Loss and damage claims cost the railroads of the United States and Canada an estimated $107 million in 1952, Warren R. White, container engineer, Union Pacific Railroad, Omaha, Neb., reported to executives attending the packaging conference.

Although this figure is lower than the postwar high of $135 million, it is "sufficiently large to point out the seriousness of the loss and damage problem," White said. "Unlike an expenditure for goods or services, which would represent the creation of national wealth, this represents an economic loss."

Partly responsible for this heavy damage toll, according to White, are changes in customs and practices. Cars are loaded more heavily today and are of greater capacity. Freight trains are longer and travel longer distances at higher speeds, and yard operations are faster.

Industry awakening to importance of proper packaging, carloading

Since World War II, industry has awakened to the importance of proper packaging and made constructive efforts to see that containers provide more efficient protection, White said. *The reduced claim payouts indicate*

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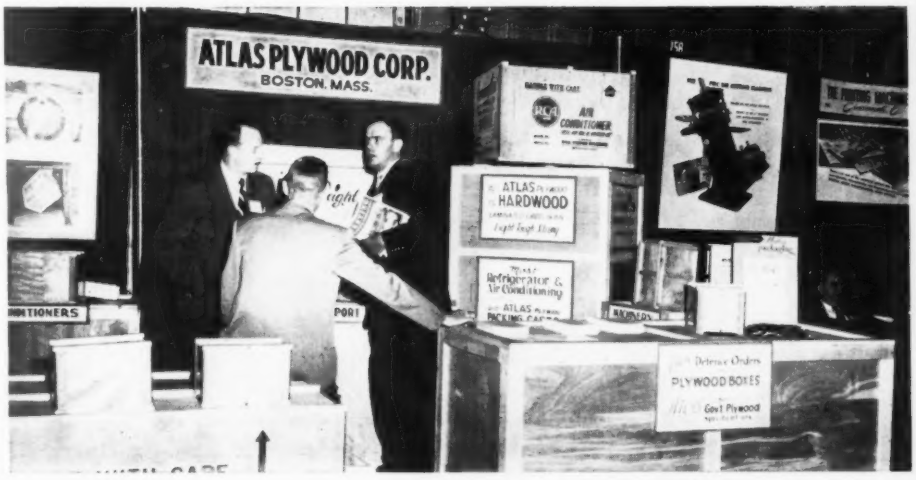
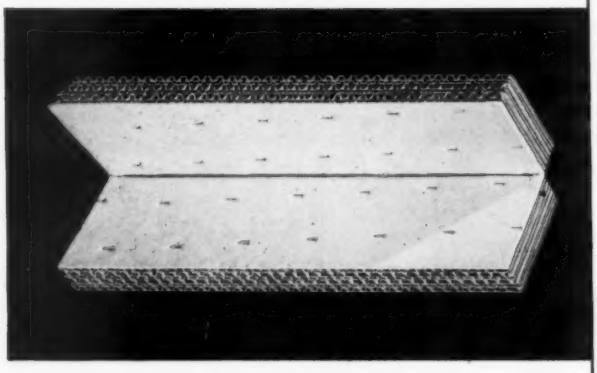


Save the Finish and Save a Claim!



That's just what **Menasha-Pak**** will do for shippers of enameled home appliances and highly finished furniture. Save a scratch, save a dent, save a split and you save a claim and maybe a customer.

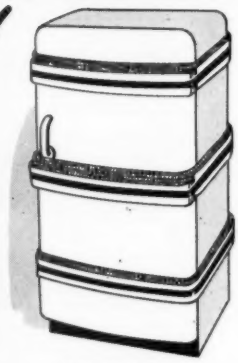
Blended into a single compact unit, the velvet smooth Kimpak* facing prevents surface abrasions, while the tough resilient corrugated backing absorbs all punishing shocks. All in one piece for easy application.

Then too there is the top-to-bottom compression resistance afforded by our hinge-cornerposts, which guarantee extra stacking strength. The hinge action of all **Menasha-Pak** corner pieces, whether "3-cornered", "slit scored", or "closed back", permits shipping to you in the flat, a factor which save freight and materials-handling cost.

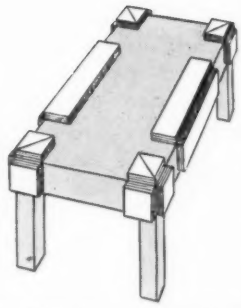
Tailor-made to your exact requirements we welcome your packaging problems. Send for samples then let us follow up with our design suggestions.

Trademark.* * Formerly called Pillowpak.*

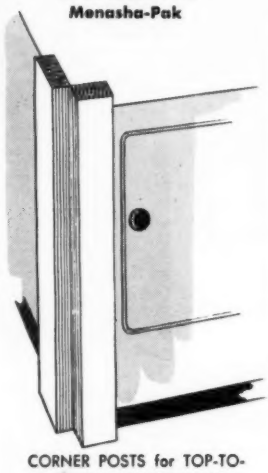
WHETHER ENAMELED APPLIANCE OR OCCASIONAL FURNITURE



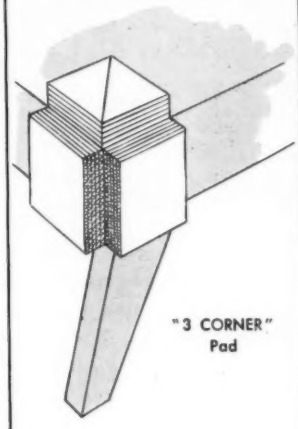
BELLY BAND TYPE
Menasha-Pak



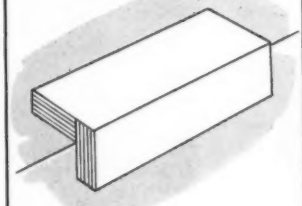
"3 - CORNER" and "SLIT SCORED"
Pads for all around protection



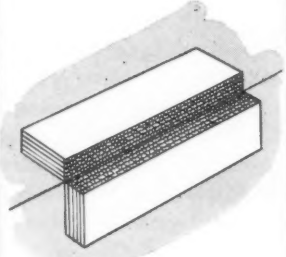
CORNER POSTS for TOP-TO-BOTTOM COMPRESSION



"3 CORNER"
Pad



"CLOSED BACK" Edge
Protector



"SLIT SCORED" Edge
Protector

CAN ALSO BE FURNISHED PLAIN OR WITH WAXED FACING

menasha pak** TRADE MARK
Non-abrasive interior packing

MENASHA WOODEN WARE CORPORATION
Menasha, Wisconsin • Founded 1849
Manufacturers of Corrugated Containers and Interior Packing Specialties

If it's tough to pack it...DRUMPAK it!

U. S. Patent 2,214,220
Other Patents Pending

For Example...

More than one third of a million Maytag Automatic Washers have been packed and shipped in DRUMPAK Heavy-Duty Containers during the past two years. If you ship appliances and have the problem of protecting porcelain, investigate DRUMPAK.

The **DRUMPAK** Heavy-Duty Container — Tailored to Fit Your Product — Gives You These Protection Features:

- **EXTRA RUGGED STRENGTH** — in DRUMPAK's end-reinforced design and tough, resilient materials.
- **CUSTOM-FITTED** — to practically any size or shape of product, to meet all shipping conditions.
- **SPACE-SAVING** — DRUMPAK comes to you knocked-down-flat for easy storage — ready to assemble in seconds.
- **MOISTURE-PROOFED** — liners are available, also sift-proofed seals for powdered products.
- **VERSATILE** — DRUMPAK is solving packing problems for such diversified products as nails, sandpaper, stitching wire, rope, plastic sheeting, rubber hose, television sets and other major appliances.

For more information write for a DRUMPAK brochure containing complete details.

Gaylord Boxes

- Corrugated and Solid Fibre Boxes
- Kraft Paper and Specialties
- Kraft Bags and Sacks
- Folding Cartons

GAYLORD CONTAINER CORPORATION

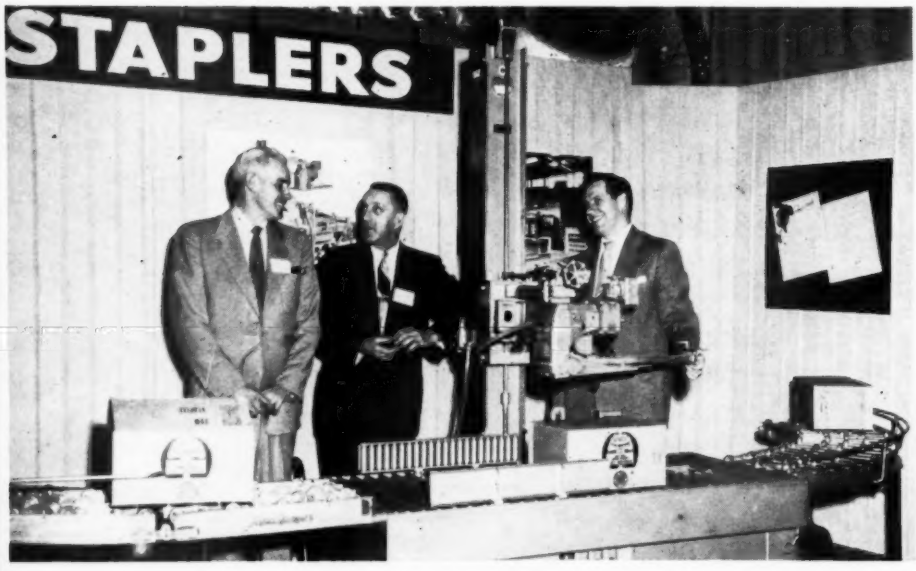
General Offices: ST. LOUIS • *Branches:* New York • Chicago • San Francisco • Atlanta • New Orleans Jersey City • Indianapolis • Los Angeles • Seattle • Houston • Oakland • Minneapolis • Detroit Columbus • Fort Worth • Tampa • Dallas • St. Louis • Cincinnati • Des Moines • Oklahoma City Portland • Greenville • San Antonio • Memphis • Kansas City • Bogalusa • Chattanooga Milwaukee • Weslaco • New Haven • Amarillo • Appleton • Hickory • Sumter • Greensboro Jackson • Miami • Omaha • Mobile • Philadelphia • Little Rock • Charlotte • Cleveland

that those efforts have been effective. With this example before them, shippers and carriers alike are now concentrating on proper carloading.

"All too often the condition of a jumbled-up load at destination is blamed on rough handling," White said. "Without denying that rough handling exists and is responsible for a certain amount of damage, it is blamed for more than its share." A recent comprehensive survey of shipping damage made by the railroads of the United States and the Fibre Box Association attributed 27 per cent of the causes of claims to conditions under the railroads' control, 34.4 per cent to conditions under the shipper's control, and 38.6 per cent to all other causes. Of the damage under the control of the shipper, 18.6 per cent was attributed to poor arrangement of load and 15.8 per cent to loose loading.

Shippers can do much to keep their goods from damage in transit, according to White. He suggested use of containers that are designed to withstand the weight of the mass behind them in case of impact, proper storage of paper and paperboard containers to avoid brittleness resulting from drying, and reporting to the carrier the need for special cleaning of cars when they have carried bulk salt, chemicals, oil, grease, asphalt, batteries, and other commodities that might contaminate the car floor.

Cars stopped for partial unloading in transit contribute more than their share to damage, White reported. Some shippers bulkhead each stop portion separately, eliminating error in the identity of the several shipments and usually making it unnecessary to rearrange the load for subsequent destinations. "In most cases the extra cost is no greater than the allowance made to have the job done improperly."



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Permanent anchor plates for use with steel strapping

The railroads are improving their facilities and making other efforts to reduce damage, White said. Permanent anchor plates are being installed in box cars for use with steel strap to secure the lading. Most of the larger railroads are using impact registers to check the handling of cars and the resistance of containers.

Union Pacific has been carrying out an educational campaign among its employees to make them damage-reduction-minded. All employees have viewed sound-color motion pictures dealing with handling of less-than-carload-lot merchandise and with careful car handling and yard operations. Loss and damage prevention subjects are discussed at periodic employee meetings. Posters are kept on bulletin boards, and a magazine dealing with prevention topics is distributed bi-monthly. Union Pacific built an exhibition box

car with a transparent side wall to illustrate the effect of rough handling on lading and showed it with a simulated load to switch crews, train crews, and yard forces *(see September, 1952,* finish, *Page ST-12)*.

"Shippers and receivers can rest assured that the railroads of the United States are making an honest effort," White concluded. "The railroads appreciate the cooperation and help of the shippers and receivers and hope that they, too, will continue to work on the problem as they have been doing since the war. With that kind of mutual assistance, victory is assured."

Scientific management needed in materials handling

Selection and application of materials handling trucks is "very slipshod" in industry today, David C. Prosser, senior methods and standards engineer, Minnesota Mining and Manufacturing Company, St. Paul, Minn., told the packaging conference.

If the maximum potential of these machines is ever to be realized, he said, the tools of scientific management that apply to them must be discovered and provided. For example, by installing material handling trucks and palletization, Minnesota Mining was able to reduce crews in its receiving warehouses from 145 men to 47 men, but investigation showed that better use of the equipment could save an additional $100,000 a year.

To develop a measurement tool, company engineers broke the fork truck operation down into six basic elements. Each element was measured individually and under controlled conditions, and a time value based on the measurement was assigned to each. After determining what safety and productivity rules and regulations applied to a given operation, the engineers determined how the operation was to be performed and then described the operation in terms of basic elements.

Each model and type of truck catalogued for easy reference

This description, showing the sequence of the elements, was set down in a "standard work procedure." The time required to perform the operation was determined by adding the standard time values for the various work elements required, with allowance for rest and delay. Each model and type of truck used in material handling was measured in this way, and the resulting information was put into a form that was catalogued for easy reference.

This measurement tool has a number of applications, Prosser reported. It gives the manager of material handling operations a sound basis for controlling his costs. For example, measurement of material handling in

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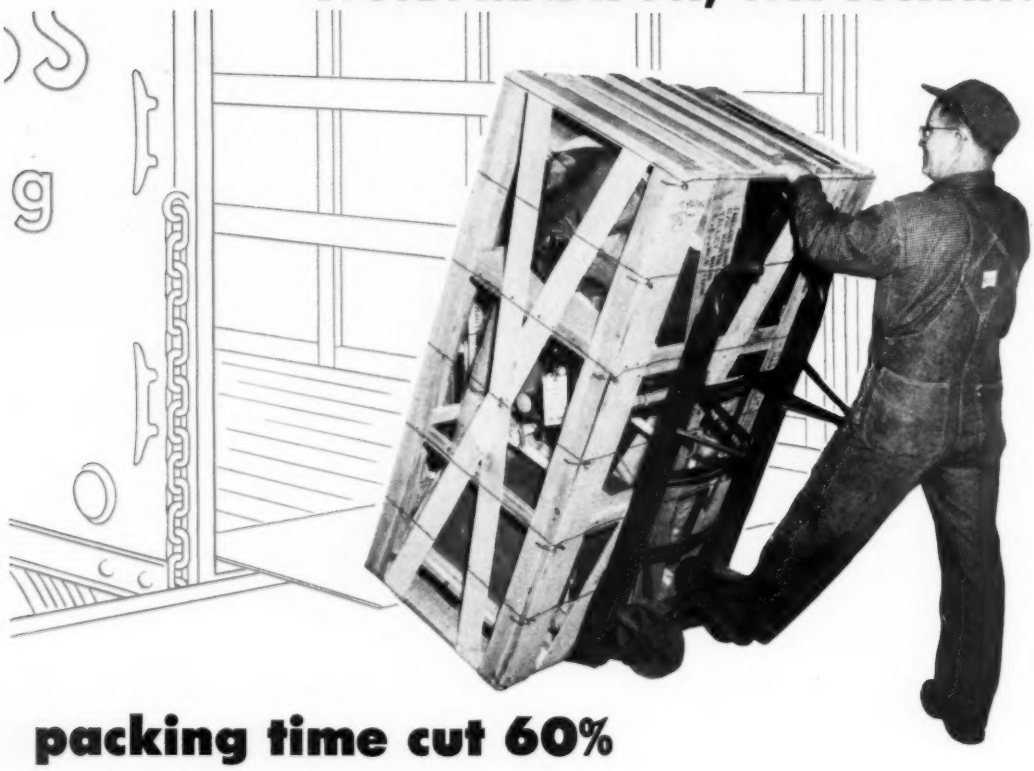

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SAFE TRANSIT NEWS

NATIONAL SAFE TRANSIT COMMITTEE

DuPont Circle Building, 1346 Conn. Ave., N.W., Washington 6, D. C.

Canadian Company Joins NST Program - Canadian Westinghouse Company Limited, of Hamilton, Ontario, is the 127th company to be certified under the National Safe Transit Program. Other Canadian firms participating in the Program are Canadian General Electric Co., Ltd., Montreal, Quebec, and Moffats, Limited, Weston, Ontario. All three companies have fully equipped Safe Transit laboratories.

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Another Laboratory Certified - Twin Cities Container Corp., Benton Harbor, Mich., is the first NST laboratory in Michigan to be certified and the 22nd to participate in the Safe Transit Program. The 22 laboratories, fully equipped to conduct the pre-shipment tests, are located throughout the country and in 11 different states.

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Educational Activities - Within one month Mr. R. F. Bisbee, General Chairman, National Safe Transit Committee, gave four speeches on the NST Program before opinion-forming groups. These included the 55th Annual Meeting of the American Ceramic Society; General Meeting of Middle Atlantic States, consisting of Westinghouse distributors and customers; Eastern Enamelers Club; and the Annual Meeting of the American Society for Quality Control. The NST film was shown at each of the meetings.

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Chicago Meeting Has Wide Press Coverage - Leading manufacturing, container, and carrier trade journals carried in their pages full reports of the Industry-Wide Safe Transit Conference in Chicago on March 16th. These accounts, together with the educational programs of cooperating groups and the NST Committee, are constantly increasing the influence of the pre-shipment testing program upon handling personnel, distributors, and dealers.

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Safe Transit Coordinating Committee Meets - Members of the NST Coordinating Committee met in New York on April 29th to lay plans for broadening the activities of the Committee. Under discussion were plans for the 1954 Safe Transit Industry-Wide Meeting, and the inclusion in the Program of general packaging materials handling and quality product ideas.

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Railway Express Agency Praises NST Program - Mr. J. J. Toughey of Railway Express Agency writes, "Adoption of the NST pre-shipment tests assures the carrier that everything is being done by the manufacturer to produce a well constructed article of merchandise, properly packaged to withstand normal handling in transit. If this is combined with safe handling on the part of the carrier, the danger of delivering a damaged product to the consignee is reduced to the absolute minimum. Realizing this we fully support the NST Program, and do everything possible to encourage our employees to safely handle all pre-tested shipments in order to reach the goal of less claims and more satisfied customers."

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Why Air Freight Needs NST - Mr. Emery F. Johnson of Air Cargo, Inc. closes an article on "Why Air Freight Needs NST" with these words, "We cannot get away from the fact that the value of the work of the NST Committee is not only worthy of every commendation, but that it has a direct bearing on the future of air freight... The goal of the NST Committee is to make shipping damage a minute problem; the goal of the air freight industry is to make shipping damage a minute problem--- a common bond. Only by working with the National Safe Transit Committee in the support of its program can we, the airlines, hope to eliminate damage as a deterrent to our assumption of a place in the front ranks of the property transportation world."

- - - - -

a new warehouse indicated the trucks in the area were being utilized only 45 per cent of the time. By increasing utilization from 45 per cent to 90 per cent, $30,000 a year could be saved.

"I do not point out this example because I think it is unusual," Prosser declared. "I point it out because I think it is typical of the warehousing and material handling truck operations as they exist today in industry."

Packaging odd-shaped parts

Odd-shaped parts need not always remain odd-shaped parts; sometimes the product can be redesigned to eliminate the special packaging problem suggested Carroll W. Evans, superintendent—parts and accessories division, Studebaker Corporation, South Bend, Ind.

Studebaker gas tanks for years had a long, integral, non-detachable crooked spout which presented a never-ending problem in packaging, Evans reported. Finally the tanks were redesigned to include a detachable spout which is now shipped unassembled.

Some irregularly shaped items can be shipped unpackaged, and others may be grouped and packed in a standard case without advance preparation. But some do demand special packaging, and that packaging, Evans said, calls for "an unusual amount of common sense, some imagination, actual packaging experience, understanding of materials handling procedures and equipment, and good contacts with suppliers of packaging material" on the part of the package designer.

The experienced packaging engineer, he pointed out, will always come up with a design that is as simple and as low in cost as possible, no matter how odd the shape of the product. Studebaker, he reported, attempts to make the product fit the package, the package fit the pallet, and the pallet fit the method of transport.

Evans suggested several general rules to make packages as easy to handle as possible: Try to hold weight within the limits of 30 to 50 pounds, because even if an item is palletized, it usually has to be stacked on the pallet and unloaded from the pallet by hand. Packages that are too large or too small are hard to palletize effectively. Small packages may be handled in wirebound pallet boxes. For maximum stability in stacking, the height of a package should be less than the width or the length. Perfect cubes are difficult to palletize. To utilize the maximum strength of the container, design the package so that the corrugation runs vertically when the package is stacked.

Many specific methods are used for packaging odd-shaped products at Studebaker, Evans said. Heavy items requiring protective packaging are sometimes packed in wirebound boxes. Special interior packing for odd shapes is provided for a large proportion of corrugated cartons. Also used are wood boxes, plywood boxes, crates, fibre containers, latex seal envelopes, polyetheline bags, padded shipping bags, excelsior pads, strapping, bundling, and wrapping materials.

Each packaging problem, he emphasized, is "a separate and distinct problem, and that is where the packaging engineer shows his ability to make use of the best type of pack for the particular item under study. If more than one method presents itself, cost is usually the deciding factor."

Appliance Engineers' Day — *at General Electric's new Appliance Park in Louisville — was the occasion for this photo taken from a moving train which carried the engineers and other guests on their trip through the Park where all of General Electric's major appliances will eventually be produced. The visit was a feature of the Appliance Technical Conference, held in Louisville, in conjunction with the Southern District Meeting of the American Institute of Electrical Engineers.* *(For factual details on Appliance Park, turn to Page 68).*

for a complete line of

WATKINS CONTAINERS

AND OTHER MATERIAL HANDLING NEEDS

See KIECKHEFER MILWAUKEE

Producers of...

WATKINS CONTAINERS
KIECKHEFER PALETBOXES
SPECIAL DESIGN CLEATED FIBRE CONTAINERS
CRATES—PALLETS
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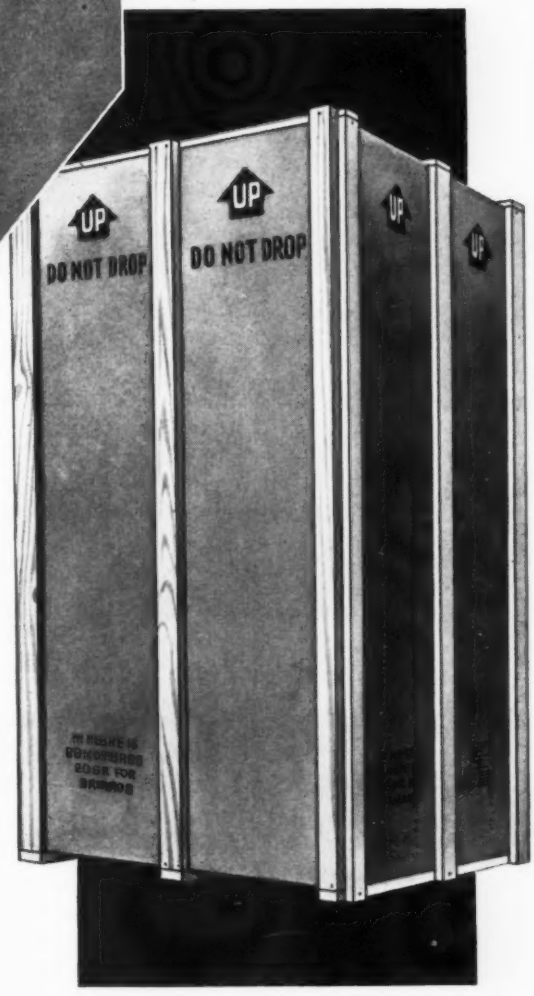

Appliances, office equipment, furniture — yes, many, many products are ideally suited to the Watkins type container. Kieckhefer-built containers of this type are strong, light in weight, and offer complete protection from dust and dirt. They offer advertising (billboard) value and in many cases save money on the packing line.

For all applications—from small parts, to neon signs, to industrial equipment—the Kieckhefer-Milwaukee practical experience and engineering background (50 years) can give you the right answer for safe and economical shipping.

Send your problem to us today — you will hear from us promptly, without obligation.

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NST MAILBAG

To: NST Educational Division

The large attendance at the Industry-wide Safe Transit meeting certainly indicated the interest that has been aroused in this program.

We are constantly testing packages at our laboratory and have found that the program is very much worthwhile — not only for manufacturers in the appliance field but also in many other industries. We use the prescribed test procedures in testing for practically all products for which we design packages in our laboratory.

A. L. Whiton
Sales Manager
Chicago Mill and Lumber Co.
Chicago, Illinois

To: NST Educational Committee

Congratulations on a splendid Safe Transit conference. We wish to compliment you and the others responsible for a job well done.

It was fast moving and well planned. There was much of interest and value, and was one of the best such meetings I have had the pleasure of attending. It certainly was worthwhile.

As early participants, we have been faithful proponents of the NST program. We have found the test cycle to be very good for many test programs which we run for customers. Therefore, we are continually explaining and selling the NST program.

I have been asked to make comments before a local packaging group in connection with the showing of the NST film. You may be sure I will take the opportunity to point out the good work and the advantages of the program.

M. J. Clark
Assistant Technical Manager
Inland Container Corp.
Indianapolis, Ind.

To: NST Educational Division

Would you please send me information regarding testing of appliances under the Safe Transit program?

Perhaps we have had this information in the past but don't find anything in our files regarding it now, and would appreciate information as to how to join in the program and how much the tests cost and how many tests you run a year, etc.

L. H. Caldwell, Jr.
Tennessee Stove Works
Chattanooga, Tenn.

To: NST Educational Division

We appreciated your offer of furnishing continued information towards this program that seems laudable and worthwhile. We have become very intrigued with it ourselves, and, therefore, attended your conference with the specific interest of becoming more acquainted with the testing and routine procedures.

Our first interest is in getting the necessary equipment in our Marshalltown plant, so that we may be checking new products as they are developed to be sure that we are taking advantage of these very logical determinations towards insuring safe transit of our products. Secondly, we intend then to follow through on other packaging of present products so that we might benefit by the economy of the whole program.

It was a very interesting story told at the conference, and we certainly

TEMCO AIRCRAFT USES SCALE MODELS OF SHIPPING CRATES TO PLAN LOADING

By arranging scale models of shipping crates on scale freight car outlines, loading crews at Temco Aircraft Corp., Dallas, Texas, are able to quickly and accurately plan loads before crates are moved to the shipping dock.

Prior to the development of the system by R. S. McClendon, Temco wood shop general foreman, freight car load planning was difficult and time-consuming, due to the variety of crate sizes and shapes used. Loading was slow and crates occasionally had to be removed from cars, and then reloaded in different positions.

McClendon devised a load planning system which utilizes scale outlines of standard freight cars and models—made to the same scale—of each crate size used. Thus, the entire load my be accurately planned by merely shifting the model crates on the freight car outlines.

Scale models of crates are made by sawing blocks of wood to size, and, since a relatively few different crate sizes are used, a number of models of each crate may be kept on hand. Loads are planned by arranging models on scale outlines of 40′ 6″ and 50′ 6″ freight cars.

By noting the location of the model crates, the loading crews can determine the order in which the crates are to be loaded, thus eliminating incorrect loading, and speeding the entire loading operation.

subscribe to the principles that you have set out and the objectives that you hope to reach.

F. H. Whitcombe
Director of Manufacturing
The Lennox Furnace Company
Marshalltown, Iowa

To: NST Educational Committee

At our meeting held recently, the National Safe Transit film was shown, and a talk was given by John Oliver, of the NST Secretarial Division.

This was indeed very educational to all our people who attended (including the general traffic manager of RCA and representative from traffic, materials handling and packaging of each of the divisions and subsidiaries), and from the comments that followed after Mr. Oliver left, I can assure you that your program was very well received.

J. P. O'Hanlon
Materials Handling Division
Radio Corporation of America
Camden, New Jersey

To: NST Educational Division

I feel a great stride forward has been made in bringing together the manufacturers, distributors and carriers into a joint conference at Chicago. Insofar as the Railway Express Agency is concerned, the distributors are the greatest source of damage claims on merchandise moving in our service. This is no doubt due to the fact that manufacturers move their products in bulk volume, and use rail freight and motor truck service. Single units and replacement parts move generally in rail express service.

We have developed that, in some cases, the large mail order houses have their own packaging engineers draw up the packing specifications for various articles that they forward. The manufacturer will use the specications and no pretesting of the packaged product is made. In following up on bad claims, we find the manufacturer in some situations is reluctant to do anything about changing packing methods. We, in turn, have to go back to the mail order houses and present to the firms the claim figures developed by our claim analysis, and then some action is recommended based on our claim experience with the product involved.

As you are aware, this takes considerable time in making the analysis of claim payments and determining if the claim ratio is out of proportion. In the meantime a considerable number of shipments have been damaged, an excessive amount of claims have been paid. This is particularly true with furniture items and in a lesser degree with radios and television sets.

It would be my suggestion that all large distributors, who design their own packing specifications, use the pre-shipment testing procedures for the products they forward. After the pack has been designed, they should insist on the manufacturer doing some pretesting of the product as it comes off the assembly line and is packaged in the shipping container. This method in my opinion would prevent the development of any bad claim situations.

In closing let me say the conference was very well planned. I hope that Ralph Bisbee was in some measure rewarded for the long untiring efforts he has given in bringing about such a joint conference and hope it brings results even beyond his expectations.

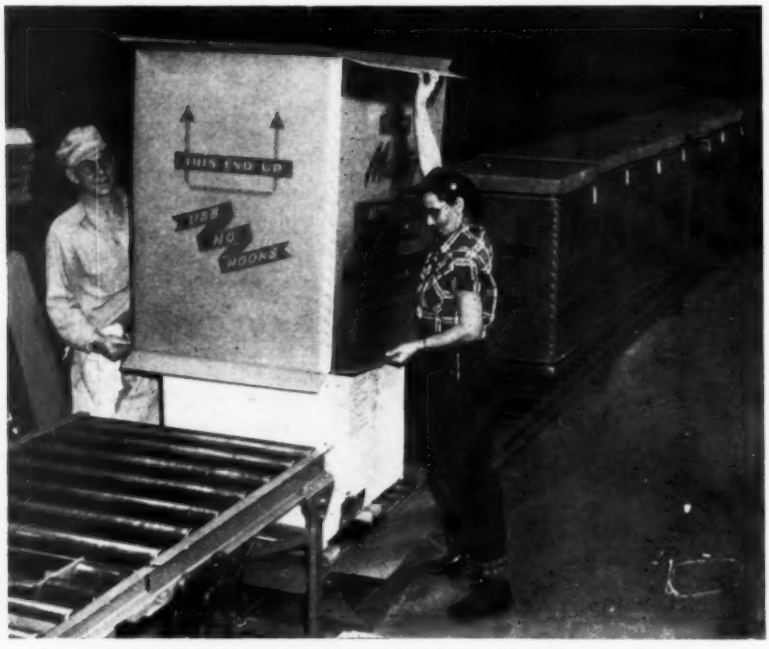
A. J. Orfait
Transportation Department
Railway Express Agency
New York, N.Y.

Packaging the Maytag clothes dryer

A PHOTO story beginning on Page 25 of this issue presents some of the assembly operations for The Maytag Company's new clothes dryer being produced at their Plant 2, in Newton, Iowa.

When Plant 2 was built in 1949 for the production of automatic washers, part of the plant area was laid out to accommodate production on their new dryer which got underway late last year. (For a detailed story on automatic washer packaging operations at Plant 2, read the 4-page article, *"Materials Handling, Inspection, Packaging and Shipping at Maytag"*, by R. H. Thompson, February, 1952, *finish).*

Final assembly operation prior to packaging is mounting of the back panel.



The completed dryer is packaged at the end of the assembly line.

Serial number tag is affixed and dryer is ready for shipment.

CANADIAN WESTINGHOUSE, TWIN CITIES CONTAINER CERTIFIED

The National Safe Transit Committee has announced the certification of Canadian Westinghouse Ltd., Hamilton, Ontario, as the 127th company certified under the NST program.

The Committee also announced that Twin Cities Container Corp., Benton Harbor, Mich., is the 22nd laboratory to participate in the NST program.

MIT MECHANICAL ENGINEERING DEPT. TO CO-SPONSOR SIPMHE '53 SHORT COURSE IN BOSTON

The mechanical engineering department of the Massachusetts Institute of Technology will present the 1953 Industrial Packaging and Materials Handling Short Course educational program next October in Boston, it was announced by Stanley Price, president of the Society of Industrial Packaging and Materials Handling Engineers.

The short course will be held in connection with the Industrial Packaging and Materials Handling Exposition and the Protective Packaging and Materials Handling Competition.

Details of the program for the short course are being arranged by Prof. C. R. Soderberg, head, MIT Department of Mechanical Engineering; Assoc. Prof. John E. Arnold, coordinator for MIT and SIPMHE; and John W. Kraus, of Thompson Products, Inc., Cleveland, chairman of the 1953 short course.

C. J. Carney, Jr., managing director of SIPMHE, said that unprecedented early interest already has been shown by prospective exhibitors at the exposition, and indications are that exhibit space will be sold out ahead of the opening date, October 19.

WOODEN BOX ASSN. TO MEET

Advance reservations for the National Wooden Box Association's annual summer meeting, June 18-20, at The Greenbrier, White Sulphur Springs, W. Va., indicate a large attendance, according to C. D. Hudson, executive vice president.

Acme Steel announces

revolutionary new advance in wire stitching

In Acme Steel's new Arcuate stitching method, flat stitching wire is formed into an arc, increasing its column strength, making a smoother stitch with lighter wire, delivering up to 42% more stitches per pound of wire. Faster, too!

New Acme Steel Arcuate Stitching cuts wire costs 24 per cent

HERE'S HOW IT WORKS: Wire stitching has long been favored for assembling and closing of cartons of all types. Now "Stitching Headquarters"—Acme Steel Company—announces a new stitching method: Arcuate Wire Stitching.

In Acme Steel's new Arcuate Stitching method, regular flat stitching wire is formed into an arc by the stitching machine, making a stronger stitch so you can use lighter gauge wire for boxmakers' joints or any other stitching jobs. Increased column strength makes each stitch easier to drive. Stitches drive straighter, clinch better, hold tight.

RESULT: You save 24% in wire costs. You get 42% more stitches from each coil of wire (using .103 x .014-inch instead of .103 x .020-inch wire, for example). Arcuate Stitching virtually eliminates machine jamming—reduces down time and produces perfect stitches more consistently. This means that you can stitch more cartons per day, and get a better-looking carton every time.

It's easy to adapt your present equipment. There are conversion parts-kits for most popular model stitching machines.

CALL your Acme Steel representative for all information. Or, for a free folder giving complete details and a stitched sample, write to Acme Steel Products Division, Dept. F-63, Acme Steel Company, 2807 Archer Ave., Chicago 8, Illinois.

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Get the details . . . send in the coupon for a free folder on Acme Steel's new Arcuate Stitching.

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"I saw your ad in finish"

CLASSIFIED ADVERTISING

PLATTS HEADS PURCHASING FOR WHIRLPOOL

Appointment of John Platts, formerly sales manager for Sears, Roebuck and Co., to the position of director of purchasing for Whirlpool Corp., St. Joseph, Mich., was announced by D. W. Alexander, vice president in charge of operations. Platts succeeds Herb Grau who resigned to assume active managership of Plastic Service Corp., LaPorte, Ind.

HEADS ROPER HOME EC. DEPT.

Geo. D. Roper Corporation, Rockford, Ill., has announced the appointment of Miss Ione Lankelma as head of the home economics department. She will do experimental testing and research work on ranges.